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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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WORLDWIDE REPORT

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VISIT TO LOP NUR NUCLEAR TEST SITE DESCRIBED

HK100848 Beijing LIAOWANG in Chinese 1, 8 Oct 84

[Parts 1 and 2 of a series of reports by Guo Diancheng and Xu Zhimin]

[No 40, 1 Oct 84 pp 17-18]

["Thunder Roars Over the Boundless Gobi--First of a Series of Reports on a Visit to Our Country's Nuclear Base"]

[Text] Since China's first mushroom cloud rose slowly in the Lop Nur area, the desolate and uninhabited Gobi Desert has been shrouded in a cloud of mystery, arousing the people's great interest. From then on, good news about the successful testing of hydrogen bombs and nuclear missiles and underground nuclear tests has continued to pour in from that area.

During the hot season this summer, we visited this area where there had been the roaring thunder of nuclear explosions -- China's nuclear test site.

Lop Nur, which was luxuriant with grass and water in ancient times, is now dry land. Travel along the Silk Road was interrupted here long ago, and nobody knows where the surviving subjects of the ancient state of Loulan have gone -- what remains is but a vast, desolate desert. For hundreds and thousands of years, except for mirages, there has been a scene of desolation everywhere in this boundless Gobi, as was described in the following verses: "Big stones lying everywhere on this vast desert, as if scattered by the wind and rolled about like baskets." It was in such a desolate land that the pioneers of the new era built China's nuclear test base.

We set off by car from a place called Malan and drove toward the ruins of the ancient city of Loulan. The scorching sun, the dazzling sunlight, and the hot wind blowing into the car made us suffer greatly. Not long after we set off, the water tank boiled, and all of us felt dreadfully thirsty. Although we had brought enough water with us, we were very hesitant and reluctant to drink it, because water is so precious in the Gobi Desert -- it means life! The Lop Nur nuclear testing base, with a total area of more than 100,000 square km, is as large as all Zhejiang Province. There was no sign of human habitation in this desolate area, and its topographical, geological, and meteorological conditions were all suitable for nuclear testing. According to Zhang Zhishan, the former commander of the base who accompanied us on the trip, more than 2,000 km of highway have already been built in this area. Aside from that, there are all kinds of

test sites for ground, tower, air, missile, underground horizontal gallery, and underground vertical shaft tests, and at each test site there is a command center, communications hub, control center, and permanent survey station. At the air testing grounds there are also some simple houses, airports, and underground water pipes. In the distance there is an airport and a factory to assemble the test items. Past nuclear tests have repeatedly proved that this base is an ideal and safe place for all the various kinds, forms, and sizes of nuclear tests. Like all other countries that have conducted nuclear tests, our country has also followed a course of development from atmospheric to underground tests. At present, underground tests are mainly carried out in this area.

After a few hours' drive, a big mountain appeared on the horizon like a black cloud. When we reached its foot, we found that some parts of the mountain had caved in, just like the scene of Chen Xiang cutting through the mountain...in a Chinese fairy tale. Zhang Zhisan said jokingly that this mountain...had a very big "belly," because several horizontal gallery tests had been carried out in this "belly." Then we understood that the cave-ins were the result of nuclear tests. At the foot of the mountain, the temperature was much higher, as there was still heat within the mountain due to the nuclear explosions.

Later we arrived at the vertical shaft testing area. Vertical shaft nuclear tests are carried out in deep shafts excavated in solid rock underground. We came to a used shaft and saw that its entrance was tightly sealed. There were hardly any changes on the ground nearby. Seeing all this, even unprofessional people like us could feel that shaft nuclear tests are safer than ground or air tests. Zhang Zhishan said that at the moment of a nuclear explosion, even the underground rock stratum, which was very thick, shook terribly. At the explosive center, a very large, round cavity was created due to the high temperature and great energy. Even though all this happened deep under the ground, the surface did not sink.

After leaving the horizontal galleries and vertical shafts, we continued to drive into the depths of the Gobi Desert. It was only midday. There was a fantastic picture before us: broken cars on dispersed rocks; piles of scrap iron, which had originally been armored personnel carriers; the wreckage of planes; destroyed cement buildings, some of which had a surface like melted glaze; and so on and so forth....

"Here," said Zhang Zhishan, "is the central testing ground for the first ground test." All those ruined buildings and weapons wreckage are the result of nuclear tests. Beginning 16 October 1964, many air, tower, and ground tests have been done in this area. It was also the target of the nuclear missile test organized and commanded personally by Marshal Nie Rongzhen in October 1966, as entrusted by Premier Zhou Enlai.

We were a bit nervous on this queer shorched land. However, as we looked ahead, we saw clusters of exuberant grass in some low-lying areas; and some yellow sheep lying in the highway ditches were scared and ran away. Oh, life is so stubborn.

In this central area where China's first atom bomb was exploded, Zhang Zhishan, who was already over 60 years old, could not help talking about something that happened in the past. He said the people on this base call the first atom bomb "596," which means June 1959. At that time, a big country perfidiously and unilaterally tore up agreements and later withdrew its experts. A very important person, who was once very well-known, said: Some people are reluctant to stay under the nuclear umbrella and want to make

atomic bombs themselves. I think they will not only fail in making atomic bombs, but will not even have any trousers to wear in the end! He predicted that the Chinese could not make atomic bombs in less than 20 years.

In order to remember that date, which encouraged the Chinese people to work more energetically, the first atomic bomb was given a code name "596." "596" was the pride of the Chinese nation.

Comrade Mao Zedong said: "In my opinion, it is entirely possible for us to make some atomic bombs and hydrogen bombs in about 10 years."

Premier Zhou Enlai called on scientific and technical workers to work hard for the prosperity of the motherland and world peace and make our own advanced weapons as soon as possible through self-reliance. "Break the nuclear monopoly, win honor for our mother land, and bring credit to our nation" became a common desire of our scientific and technical workers and the builders of the nuclear testing base. Old professors went to the first front without hesitation; students studying abroad returned to the motherland before completing their courses; staff and workers of military academies bid farewell to their wives and children and settled down in the depths of the Gobi Desert; and group after group of PLA officers and men entered the desert to take part in the construction of the nuclear testing base. Relying on its own strength, China began to study and make nuclear weapons.

Some of the scientific and technical leaders now working on this base in those years were young scholars who had returned from other countries, and one of them is Zhou Guangzhao, vice president of the Chinese Academy of Sciences, who also took part in the study and testing of China's first atomic bomb.

History has repeatedly proved that the Chinese people and the Chinese nation can never be overwhelmed by any difficulty. They have always been good at turning pressure into motivation.

In as little as 5 years and 4 months, the first atomic bomb was successfully exploded. For the first time, the mushroom cloud rose over Lop Nur. The joyful people said that the illustrious prophet should be awarded a 1-ton medal for spurring us on in making the atomic bomb.

The testing area is not suitable for habitation or building permanent living facilities. That is why the builders of the testing base established their own "capital city" some hundreds of miles away in the depths of the Gobi Desert. This newly established city is just like a green aircraft carrier on a sea of sand.

We came to the "capital" of the base. In the past, there was only a small stream and some grassland in this area. However, wherever there is water there is life. The builders then pitched camps there. Now, row upon row of houses have been built, and the streets are tidy and clean. There are work areas and living areas in this city, and we can also see book shops, banks, post offices, grain shops, hospitals, schools, kindergartens, department stores, and auditoriums. The middle school and kindergarten have signs inscribed by Marshal Nie Rongzhen. A reservoir has been built in this city, which stores water from the Tianshan to satisfy the needs of the people in daily life and irrigation. A television relay station has also been established, and many families have color TV sets in their homes. When we walk slowly along the boulevard of this "capital city," we feel as if we were walking along the seashore.

In the scientific research area, there are many buildings among green trees, such as the Hydromechanics Building, the Solid Mechanics Building, the Optics Building, the Physics Building, the Radiation Chemistry Building, the Computer Building, and the Data Building. This is a place where scientific and technical workers gather.

During our visit, the evening market had just opened. Commodities for summer use from Beijing, Shanghai, and Tianjin, and washing machines, recorders, and color TV sets enjoy good sales on the evening market there. We very much appreciated the sweet hami melon, watermelon, and grapes produced here.

[No 41, 8 Oct 84 pp 28-29]

["Do Not Forget Premier Zhou's Exhortations--Second in a Series of Reports on a Visit to Our Country's Nuclear Testing Base"]

[Text] At the nuclear testing base, we can often see the following eye-catching words written on the walls of buildings and on posters: "Be serious, conscientious, prudent, steady, and reliable in our work and ensure perfect safety." Elderly commander in chief Zhang Zhishan said that this was a strict demand that the respected Premier Zhou Enlai put forth on our national defense scientific testing tasks when he was alive. This has also been a fine work style that he personally initiated and fostered. In order to achieve this aim, Premier Zhou threw all his energy into the work.

In his room in the living quarters, wearing presbyopic glasses, he opened a thick book entitled "Materials for a Simplified History of the Nuclear Testing Base," and emotionally told me of some unforgettable incidents in the past.

On the evening of the day when our first mushroom cloud rose in the sky, as people were toasting to the happy victory, the telephone suddenly range urgently. General Zhang Aiping who commanded this nuclear test left his seat, picked up the telephone receiver and said: "Oh, Premier...."

"I am very happy to hear your report on your success in the test." Having expressed his congratulations, he said, "However, you should also tell me what evidence you have to prove this success. I have to report to Chairman Mao...." Zhang Aiping was deeply moved by Premier Zhou's spirit of being scrupulous about every detail. He stood by the telephone and briefed the premier on the various kinds of samples and data collected in the area of explosion, the charts that were drawn, and other relevant states of affairs, as if he was counting his family treasure. Hearing this, Premier Zhou was very satisfied.

As far back as when our country was developing its first atomic bomb, Premier Zhou personally listened to briefings and gave instructions that we had to seek truth from facts, proceed step by step in an orderly way, work steadfastly, and guard against arrogance and rashness. Our work should be characterized by a high political and ideological level, good organization, and strict discipline, and should be well-planned and highly scientific. He time and again stressed that in doing research and testing work, we should be serious, conscientious, prudent, steady, and reliable and ensure perfect safety.

During the more than 10 years preceeding his death, Premier Zhou personally presided over about 100 special meetings. He often concerned himself with this work ranging from the drawing up of plans for our scientific and technological undertakings for

national defense to the concrete arrangements and progress of every test. On 12 June 1967, Premier Zhou presided over a meeting to listen to the briefing by a vice minister in charge of the Commission of Science, Technology, and Industry for National Defense on preparations for our country's first hydrogen bomb test. This vice minister said that all the preparatory work for the test had been going on normally. However, during the practice run for the air release maneuver it was discovered that there were three tears in the parachute that carried the product. Having listened to the briefing, Premier Zhou seriously pointed out: Can we say "Things have all been going on normally" when there are three tears in the parachute? This shows that we failed to adopt a scientific attitude. We should not be too optimistic, should seek truth from facts, should never be too careless, and should keep improving our work all the time. We should adopt safety measures to cope with accidents and should show great concern for the safety of our people. The premier also told all of us that Vice Chairman Nie Rongzhen would soon hurry to the site to lead this test.

Whenever a nuclear test was being carried out, Premier Zhou always personally waited by the telephone to directly understand the state of affairs at the site and promptly handle problems. Premier Zhou's instructions and magnificent practice has always been deeply engraved on the mind of Zhang Zhishan, a veteran soldier. He told us that for over 20 years, all the personnel who took part in the nuclear tests have not forgotten Premier Zhou's instructions and have worked selflessly with a lofty sense of responsibility for the party and the people and wonderfully fulfilled the various nuclear testing tasks.

When we were at the base, the scientific and technological workers were busy making preparations for a new testing task. On the highway, trucks ran one after another carrying testing equipment. In the camps, the scientific and technological workers were seated while doing their work while the leading cadres of the base and the various operational departments were working in their offices at the site. The site, which is quiet at ordinary times, was seething with activity.

As we should often change sites when carrying out underground nuclear tests, a great amount of complicated work has to be done to install testing instruments and equipment at the sites. Having been shaken in long-distance transportation, many of the instruments had to undergo shakedown tests again. Many precision instruments have to undergo adaptability tests in dry, windy, and sandy surroundings. All the scientific and technical workers, veterans who had taken part in dozens of nuclear tests or those who had just graduated from colleges, were deeply engrossed and very careful in their work. When they carried out rush tasks, they had meals in their workshops, took no rest at noon, worked more than 10 hours everyday and even stayed up late sometimes. Because of the fatigue from their work, the hot weather, and the poor quality of the drinking water at the sites, quite a few of the workers there suffered from indigestion and lost weight day by day; but they always stood fast at their posts.

The Cable Company was an advanced unit that had installed over 12,000 km of cables without any accidents due to negligence. At that time, the whole company was working intensively in the scorching hot weather on the Gobi Desert. One day when they tested the whole site's wiring, because of some problem related to the wire, the signals of a group of instruments showed a moment of instability. However, they soon became normal. Though this was within the allowed scope, the cadres and fighters of the company were not willing to leave this problem unattended, as if it had been sand in their eyes. Under the leadership of the company captain, they all tested the cables one section after another in all directions under the scorching sunshine and on the hot desert. They worked from 0900 to 1700, walked over 40 li, checked over 1,000 welded contacts and finally found the unsatisfactory contact.

At the pithead where the drill of lifting and installing the "product to be tested" was carried out, we saw the leaders responsible for the technical work in the base were arranging and directing the work. All the operators were engrossed in the work as if this was not a simulated model but an actual atomic bomb. This scene made us recall a past incident that Zhang Zhishan had mentioned when he briefed us on our country's first nuclear test.

At that time, all the people taking part in the test had withdrawn to safety areas, silence ruled over the busy testing site, and the mountain-shaking moment was coming soon. Two jeeps raced toward the iron tower where the atomic bomb was installed. In the jeeps were Zhang Yunyu, commander of the testing base, Li Jue, leader of the unit that developed the product, and two technicians. They were going to complete the final working procedure -- installing the detonator of the atomic bomb. The drill of doing this had already been carried out hundreds of times by these two technicians. However, at this final juncture, in order to prevent even the smallest chance of a mistake, the two leaders accompanied the two technicians to the tower. After they finished the process, the two leaders left the atomic bomb which might have been "triggered at any moment."

Twenty years had passed, but the people at the base still could not forget this incident. A nuclear test is a large-scale comprehensive scientific experiment. At the testing site, there are tens of thousands of various kinds of instruments and tools to test the effects of the explosion.

The number of people taking part in a test ranges from several thousands to nearly 10 thousand. Any negligence or error may affect the results of the test or even lead to the failure of the test. At the testing base, everyone kept well in his mind Premier Zhou's instruction, had a great goal in his mind and demanded a high standard in his work. Company No 4 that was carrying out transportation tasks at the site was precisely one of such advanced collective. The company had 50 vehicles in all, and all of them had operated safely for 19 years. Volunteer soldier Wang Yongfu had been in the Army for 15 years and had constantly improved his skill. He safely drove his vehicle for over 388,000 km through storms on the desert and on the white snow that covers Tian Shan and never had even the smallest accident. In order to ensure the safety of the instruments carried in his truck, he sometimes preferred to suffer the coldness and took off his fur-lined coat to wrap the instruments.

Nuclear tests -- in particular those carried out in the atmosphere -- have very exacting demands regarding weather conditions at the site. However, before the base was established, we had no data about the weather in the area of Lop Nur. With great interest, we visited the weather station at the site and interviewed Wang Wenqing, chief of the general weather station at the base.

Wang Wenqing had achieved outstanding merits in the meteorological work of the base. He is 47 or 48 years old this year and is a native of Heilongjiang Province. He talked in a frank and straightforward manner but he never said anything about his personal contribution and his unit's achievements.

With Zhang Zhishan's help, we learned something about the base's meteorology department -- a heroic collective.

One day, everything was ready for an atmospheric test explosion and that time of the explosion was fixed. However an easterly wind was blowing at the testing site instead of the westerly wind that we needed for the test. Those who came to see the test were uneasy and the commander time and again called the weather room. However, the weathermen always gave the firm answer: "There will surely be a westerly wind at the 'zero-hour'!"

"Zero-hour" came increasingly nearer, but the easterly wind did not weaken in the least. There was an atmosphere of anxiety at the site. Ten minutes before "zero-hour," a miracle occurred -- the colored flags in the site changed direction and fluttered to the east. The westerly wind came and the test was carried out on time.

In 1966, after two successful nuclear tests, the CPC Central Committee decided to do a third test before the eve of the new year. However, snowy and cloudy weather began in the area of the site on 25 December. Judging by previous data, once this kind of weather began, it would last for at least 5 days or even half a month before fine weather returned. Could a short period of fine weather be found amid this bad weather, thus enabling us to carry out the CPC Central Committee's decision? The weathermen plunged into intense work. Through 2 full days and nights of analysis, in the wee hours of the 26th, they reported to the test headquarters that there would be a short period of fine weather at midday on the 28th. Headquarters fixed 1200 on the 28th as the time for the nuclear explosion. Snow kept falling unceasingly on the 27th. The commander anxiously paced to and fro in the snow in an overcoat.

Early on the morning of the 28th, the annoying snow continued to fall thickly. At 1030, the snow stopped and the clouds began to thin out. At 1100, the sun was shining and there was a blue sky over the site.

In a mood of mixed surprise and excitement, people heard another nuclear explosion shake Lop Nur.

Wang Wenqing said that the miraculous accuracy of the weatherman's forecast was first due to the accurate meteorological data provided by "Yangpingli Weather Station." Before this weather station was set up, there was no meteorological data for the Lop Nur area. During the 1930's, a foreigner came here and wanted to create a "miracle." However, he stayed for only 2 hours and then ran away crying: "It is impossible to survive there."

In November 1960, the base sent four meteorological fighters, four guards, and two drivers and ordered them to set up a weather station deep in the Gobi Desert near a wooden stake marked "III B -- 57." They called this station "Yangpingli Weather Station." The fighters loaded up the instruments and luggage and drove their trucks for three days in search of the stake and finally found it. The very day when they found it, they installed the thermometer screen and anemoscope, and the next day they sent their first batch of meteorological data to the base.

Since that time, the "people at Yangpingli" have been engaged in the arduous and great work day and night in the remote and uninhabited Gobi Desert despite the summer heat and the freezing winter cold. When there was a storm, hand in hand they protected the thermometer screen and when there was a rainstorm, every one of them rushed to salvage the files. During the 24 years since the station was established, their data has always been accurate and error-free. This has ensured satisfying the needs of the nuclear tests and has created miracles in the history of our country's meteorological work. For this they were granted by the Ministry of Defense the title of "Exemplary Weather Station."

CSO: 5100/4119

PEOPLE'S REPUBLIC OF CHINA

EXPERIMENTAL NUCLEAR FUSION DEVICE CONSTRUCTED

LD061219 Beijing XINHUA in English 0907 GMT 6 Nov 84

[Text] Chengdu, November 6 (XINHUA) -- Chinese scientists have built the country's largest controlled nuclear fusion experimental device near Leshan City, Sichuan Province, southwest China. The device, which started trial operations on September 21, has proved satisfactory, according to the scientists. Controlled nuclear fusion is in the forefront of nuclear research efforts in the world today. The problem is to control the process of nuclear fusion and fully utilize the energy released.

The device, called HL-1, is a medium-sized one compared to the Tokamak test reactor at Princeton University in the U.S. It was designed by the Southwest Physics Research Institute and all its equipment was manufactured by about 100 factories and institutes under the Ministries of Machine-Building, Electronics and Nuclear Industries as well as the Ministry of Education and the Chinese Academy of Sciences.

The building of such a device will help Chinese scientists acquaint themselves with the prerequisite conditions and laws governing controlled fusion, and solve related [word indistinct] scientists believe that if the fusion process can be controlled, mankind will have an inexhaustible source of energy, because sea water, which covers 70 percent of the earth, abounds in fusion fuel.

CSO: 5100/4114

PEOPLE'S REPUBLIC OF CHINA

CHINESE SCIENTISTS MAKE FUSION POWER 'BREAKTHROUGH'

HK080611 Beijing CHINA DAILY in English 8 Nov 84 p 1

[By staff reporter Li Xing]

[Text] China has taken the first major step towards producing nuclear energy by the controlled fusion process. In the country's largest experiment of its kind, scientists have produced their first burst of hot, ionized gas plasma.

"Production of plasma is the first step on the road to cleaner and safer nuclear power thorough the fusion process," said He Chengxun, deputy chief of the experimental installation. Fusion is the uniting of nuclei. So far, nuclear power has been produced only by fission, the splitting of atoms.

The first test plasma was produced on September 26 at the Southwest Physics Research institute tucked away near the Leshan Giant Buddha in Sichuan, north of Chengdu. The institute is under the Nuclear Industry Ministry.

The plasma was generated inside a doughnut-shaped magnetic confinement chamber which is part of an "HL-I" Tokamak fusion test device. This prevented the ionized gas from escaping. In plasma, electrons are separated from the atomic nuclei of two heavy hydrogen isotopes -- deuterium and tritium.

The plasma only existed for a few milli-seconds, but it was a crucial early beginning for the process in which nuclei can collide and fuse.

In a fusion reactor, energy would be released when hydrogen isotopes fuse at temperatures of well over 100 million "absolute" degrees. At such high temperatures, there is little difference between Fahrenheit and Centigrade. Fusion is the process that keeps the sun and other stars burning. The fission process used in today's nuclear power plants splits heavy atoms to release energy.

He Chengxun stressed that "HL-I" was only a medium-sized device compared with the Tokamak Fusion Test Reactor at Princeton University in the U.S.; the joint European Torus in Britain, set up by the EEC; and large ones in the Soviet Union and Japan. "But it will helps us to study the strange behavior of plasma physics and learn more about fusion," he said. "The device will not approach the extreme temperatures needed for fusion for some time."

He said scientists throughout the world were speeding research on fusion. They believe that, if controlled fusion can be made to work on earth, mankind will have an

inexhaustible source of energy. "Scientists calculate that there are about 10 billion tons of deuterium in the earth's seas. The energy released from one gram of deuterium is equal to that from 100 cubic metres of petrol (22 gallons)," he said.

Deuterium can be extracted cheaply from the oceans while radioactive waste from the fusion process is extremely small compared with that from fission, which must be stored. But research is costly and time-consuming. According to a report, Princeton's $314 million Tokamak is not expected to produce as much energy as it consumes until 1986.

After that, a new generation fusion reactor will be needed to produce sufficiently hot, dense and stable plasma to burn on its own. The goal for this is 1994.

Commercial fusion power plants are not expected to be on line until the year 2025.

He Chengxun said that China's "HL-I" would not reach the "scientific break-even" level. "We have been lagging in this field, especially in the construction of fusion experimental devices. But we will use the 'HL-I' to try to catch up with the rest of the world.

CSO: 5100/4117

PEOPLE'S REPUBLIC OF CHINA

BACKGROUND ON FUSION RESEARCH GIVEN

HK080613 Beijing CHINA DAILY in English 8 Nov 84 p 5

[By staff reporter Li Xing]

[Text] Scientists who helped build "HL-I" expressed mixed feelings about China's largest controlled fusion experimental device at the Southwest Physics Research Institute in Sichuan. They said they were happy that the key components of "HL-I," including its elaborate magnets and vacuum chamber functioned as planned. It is designed to produce results comparable to similar medium-sized devices in developed countries.

However, they did not feel satisfied. "We've just turned on this medium-sized device while American scientists are aiming to reach 'scientific break-even' -- producing as much energy as the device consumes -- by 1986 or 1987," He Chengxun, deputy chief of the experimental installation, told a group of visiting reporters.

Chinese scientists started research on harnessing fusion reactions in 1958. By that time, the Soviet Union, the US, and Britain had made public some of their research results. Before that, they had pursued their objectives in complete secrecy. Chinese scientists set up several research groups in the country. But they soon met problems that had challenged scientists throughout the world. A fusion reaction occurs at temperatures over 100 million degrees. Such high temperatures are needed to maintain the reaction and release surplus energy.

There is now no earthly material that can withstand 100 million degrees. So scientists came up with the idea of a powerful magnetic field, whose lines of force they believe would confine plasma, the electrically charged hot gas generated at the first stage of fusion, and insure that atomic nuclei would collide and fuse.

Difficulties

But designing a magnetic field of adequate strength so that it would not leak plasma and could keep the fusion process under control posed one of the toughest scientific and engineering challenges of modern times. Before Chinese scientists could solve the problem, the country was plunged into three years of difficulties by continuous natural disasters from 1959 to 1961, and economic setbacks. "Our research group in Beijing became smaller," said Qian Shangjie, deputy chief of the research institute under the Ministry of Nuclear Industry.

By the end of the 60s, the group in Beijing joined hands with another in the northeast that was also engaged in fusion research. They were making progress when the "Cultural Revolution" broke out and interrupted their research.

As early as 1964, Soviet scientists designed a type of controlled fusion facility called Tokamak, which could confine plasma inside a doughnut-shaped chamber by driving an electric current along the centre line of the plasma itself.

In 1968, they published experimental data that showed their Tokamak model's stable plasma ring producing a relatively long-lived neutron radiation that appeared to be the result of fusion.

Soon, American, European and Japanese scientists also adopted Tokamak designs, adding their own innovations. The devices grew larger and larger so that the increasing strengths of the magnetic field could match the higher temperatures and density of the plasma needed to achieve the "scientific break-even" point. Chinese scientists decided to build their own Tokamak in late 1970. They began work with a picture and information from a Soviet physics magazine issued in October 1964.

Information

By that time, they had settled in the Leshan area north of Chengdu in Sichuan. There wasn't much industry there. Transportation was difficult because of narrow highways.

"Information from the outside world was hard to come by, since China was practically cut off during the 'Cultural Revolution," said Qian, the senior physicist.

Above all, they faced tremendous technical and engineering difficultues. The complex components of the experimental device -- the magnetic field and the vacuum chamber -- were new to China's processing and machinery industry. Some factories refused to accept orders; they felt they could not meet the high technical requirements and were reluctant to produce only one model for the research institute.

Qian said it took three years to find a factory that was willing to try to produce the doughnutshaped chamber. The design of the special generator that supplies powerful pulses of electricity took nearly three years.

"The effort showed that our industry needs major renovation to meet growing technical and engineering requirements," Qian said. "But we adapted our designs to our industry while striving for higher technical goals. We hoped to build one device that was comparable to similar medium-sized devices in other countries."

While building "HL-I", the scientists and technicians at the institute made smaller experimental devices and searched for other approaches to fusion reactions. With these smaller devices and different approaches, scientists studied the behavior of plasma and the control of fusion reaction. They also made diagnostic devices to measure the strength of magnetic fields and temperatures and to gather other data when the experimental "HL-I" was turned on.

"HL-I" now works. "It provides us with a powerful tool for fusion research and opens a way for us to build larger devices," He Chengxun said at a press conference. But Qian, one of the dozen scientists who have worked on fusion research since 1956, said he is now worried how to improve "HL-I" and turn it into HL-II." "After all, we have not yet even started to tackle the problem of how to achieve a far hotter and denser plasma so that we can also reach the 'scientific break-even' point," he said.

CSO: 5100/4117

PEOPLE'S REPUBLIC OF CHINA

NEW STATE NUCLEAR SAFETY BUREAU ESTABLISHED

HK121035 Beijing ZHONGGUO XINWEN SHE in Chinese 1020 GMT 9 Nov 84

[Report: "China Sets Up State Nuclear Safety Bureau" -- ZHONGGUO XINWEN SHE headline]

[Text] Beijing, 9 Nov (ZHONGGUO XINWEN SHE) -- Wu Xing, spokesman for China's State Science and Technology Commission, today announced that China has established a State Bureau of Nuclear Safety. Jiang Shenjie, a well-known expert in the nuclear chemical industry, is to be its first chief.

Wu Xing announced the news at a press conference attended by both Chinese and foreign reporters. He said that the State Bureau of Nuclear Safety will examine the safety of China's civil nuclear facilities, supervise them, and administer them according to the state's relevant laws, decrees, orders, and regulations, and will organize research into nuclear safety. The bureau is a government power organ directly subordinate to the State Council.

The chief duties of the State Bureau of Nuclear Safety are: to be responsible for drafting the state's basic law on atomic energy; to organize the drafting and formulation of the laws, regulations, guidelines, and standards concerning the safety of civil nuclear facilities; to introduce rigorous and effective procedures for examining safety; to examine the safety of the civil nuclear facilities built by ourselves and of those imported from abroad; and to issue construction permits and operation licenses; to inspect and supervise the safety work of those civil nuclear facilities whose construction and operation have been approved; to organize the departments concerned and the localities to launch scientific research into the safety and management of civil nuclear facilities; and to carry out international exchanges and cooperation in the nuclear safety field.

Wu Xing said that the work of the State Bureau of Nuclear Safety is aimed at ensuring public safety and the personal safety of the workers inside the plants, protecting the environment, and protecting civil nuclear facilities from sabotage as much as possible, whether nuclear facilities are operating normally or accidents or natural disasters occur.

A Hong Kong reporter asked: What measures have been taken to ensure the safety of the Guangdong nuclear power plant?

Wu Xing answered: At present we are examining the safety facilities of the Guangdong nuclear power plant. We are also examining their sizes and the safety of the imported facilities.

The reporter asked: China has applied nuclear energy for a long time. Why did China wait so long to establish a nuclear safety bureau?

Wu answered that China has just begun its large-scale application of nuclear energy and large-scale construction of nuclear power plants. Thus, the present is an appropriate time to establish a nuclear safety bureau.

The reporter asked: In formulating nuclear safety standards, which countries will China use as guides?

Wu answered: China joined the International Atomic Energy Agency [IAEA] this year. China will take an active part in the safety activities organied by the IAEA. In addition, China will also strive for the agency's support and help in the areas of safety examination, research, and training of personnel. In formulating safety standards, China has drawn on the experience of the United States, Japan, and the Federal Republic of Germany. One cannot say the bureau is modeled after any one country's.

CSO: 5100/4119

PEOPLE'S REPUBLIC OF CHINA

JIANGSU, LIAONING NUCLEAR PLANTS TO BE BUILT

HK110546 Beijing ZHONGGUO XINWEN SHE in Chinese 1417 GMT 9 Nov 84

[Text] Beijing, 9 Nov (ZHONGGUO XINWEN SHE) -- Aside from the Qinshan nuclear power plant in Zhejiang and the Guangdong plant, which are both currently under construction, China has also formally decided to build a nuclear power plant in Jiangsu Province and another one in Liaoning Province.

This was revealed in Beijing today by Wu Xing, spokesman of the State Science and Technology Commission, at a press conference attended by Chinese and foreign reporters. He said that the installed capacity of the Jiangsu nuclear power plant will be 2 X 1 million kw. The main items of eqjipment for these two plants will be imported from abroad. It has not yet been decided which companies will supply the equipment. A number of French, Japanese, and American companies have put forward proposals on supplying this equipment to China.

Wu Xing said that China now plans to build five nuclear power plants. Apart from the four mentioned above, there is the Jinshan thermonuclear power plant at Shanghai. The termal power of this plant will be 450,000 kw, and it will be mainly used to supply heat and power to the Shanghai petrochemical general plant. The installed capacity of the Zhejiang Qinshan nuclear power plant will be 300,000 kw. The main items of equipment for the Jinshan and Qinshan plants will be made in China.

CSO: 5100/4119

PEOPLE'S REPUBLIC OF CHINA

FIRST DOMESTIC HIGH-FLUX REACTOR PASSES TESTS

OW130831 Beijing XINHUA Domestic Service in Chinese 0848 GMT 12 Nov 84

[By reporter Zhuo Peirong]

[Text] Chengdu, 12 Nov (XINHUA) -- Since its high-performance run at the end of 1980, the first high-flux nuclear reactor designed and built in China has been running safely for more than 3 years. It has successfully passed nearly 100 operational tests closely related to economic construction and the people's livelihood. Its products are now being used in many fields.

The reactor is built according to a design provided by the Southwest Engineering Research and Desi,ning Institute for Reactors under the Ministry of Nuclear Industry. During the past 3 years and more, the reactor has used up eight loads of nuclear fuel. It is now using its ninth load. Facts show that the reactor's design is a success and that its main indices are of advanced nature. Its various operational data and characteristics are now available after it has gone through a large number of tests in the field of physics, hydraulics, and thermodynamics. The various radioactive isotopes and the transplutonium element produced by this reactor have already been used in many fields including medicine, scientific research, and the food industry. More than 40 radiation centers are being built or have been built throughout the country to make use of its radioactive isotopes for livestock breeding and keeping food fresh. Measurements conducted near the reactor show that its radioactive levels are far lower than those specified by the state, thanks to safety and protective measures taken by the local authorities.

CSO: 5100/4119

PEOPLE'S REPUBLIC OF CHINA

SHANGHAI NUCLEAR PLANT CONSTRUCTION STEPPED UP

HK140615 Beijing ZHONGGUO XINWEN SHE in Chinese 0708 GMT 12 Nov 84

[Report: "Preparatory Work for Jinshan Nuclear Heat and Power Station Reaches Overall Design Stage" -- ZHONGGUO XINWEN SHE headline]

[Text] Shanghai, 12 Nov (ZHONGGUO XINWEN SHE) -- Preparations for building the first phase of the Jinshan nuclear heat and power station in Jinshan County, Shanghai, are being stepped up. After the conclusion of the discussion on the feasibility of plans for the 13 systems of the nuclear heat and power plant, the work has reached the overall design stage.

The Jinshan Nuclear heat and power station will have total a capacity of 2 times the 450,000 kw of thermal power. After its completion, it will supply power and heat energy to the Shanghai Petrochemical Plant. By now, the departments responsible for planning and design have concluded the discussion on the feasibility of the 13 systems, including the reactor cooling system, the shut-down cooling system, the boron recovery system, the chemical control system, the displacement control system, and the safety shell sheltering the network of waste fluid ducts and major process ducts, and so on. In addition, they have drawn the flow diagrams for these systems and have sketched the facilities and arrangement of compartments for various processes and have designed the facilities and the overall arrangement of the safety shell and the auxiliary buildings.

The technical design of the nuclear island of the Jinshan nuclear heat and power station is being undertaken by the Southwest China Reactor Enginnering Research and Design Institute. Now, they are designing the fuel assemblage of the reactor, the driving mechanism, the pressure vessels, the in-pile members, the reactor control system, and the in-pile test system. They are also devoting great efforts to the research into and the trial-production of fuel assemblages and so on.

CSO: 5100/4119

PEOPLE'S REPUBLIC OF CHINA

JINGJI RIBAO ON SAFETY, ECONOMY OF NUCLEAR POWER

HK241213 Beijing JINGJI RIBAO in Chinese 15 Dec 84 pp 1, 2

[Article by Wang Naifeng: "Dispelling Misgivings on Nuclear Power Stations"]

[Text] At a session of the Sixth NPC Comrade Zhao Ziyang pointed out: "We should speed up the development of the electric power industry by developing hydropower, thermal power, and nuclear power." This is completely correct. In the past China's electric power industry relied mainly on thermal power while making hydropower subsidiary.

It now seems that relying merely on thermal power and hydropower makes it difficult to meet the needs of national economic development. Although China is rich in coal resources, its per capita output is still low. At present the output of coal is 600 million tons. It will be 1.2 billion tons if doubled, and the per capita output will be only 1 ton. This per capita output is very low if compared with that of economically developed countries in the world. Therefore, in solving the energy problem, it is necessary to develop energy production in a diversified manner and to put the development of nuclear electric power on the agenda.

At the mention of nuclear electric power, some people will cast doubts on its safety and economical use. Will the establishment of a large number of nuclear power stations cause radioactive pollution to the environment? Will it harm human bodies? Will nuclear power stations be as economical in their use as hydropower or thermal power stations?

Uranium 235 is used as fuel in present-day nuclear power stations. It is true that this element can produce very strong radioactivity. But after several decades of efforts, world scientists can now control its radioactivity. When building a nuclear power station, strict protective measures are taken so that it is contained in a tight safety case. The radioactive substances in the waste gas and waste air discharged from the nuclear power station are almost negligible. Under the condition that the nuclear power station operates normally, the radioactivity that the residents, near the nuclear power station, are exposed to annually is merely 1 millirem, equivalent to one-fortieth of the radioactivity resulting from having one X-ray photograph taken. Even the accident which took place in the Three Mile Island nuclear power station in the United States in March 1979 did not cause any danger. After the accident the radioactivity which the residents within a radius of 80 kilometers, experienced was only 1.5 millirems. No one's health was harmed and no hereditary physical defects were noticed. Obviously, the seriousness of the accident was exaggerated by some people.

Since the first nuclear power station was put into operation in the Soviet Union in 1954, large and medium-sized nuclear power stations throughout the world have accumulated

2,000 reactor years of operational experience (one reactor operating for one year is called one reactor year). No large-scale radioactive leakage has ever occurred and no citizen or employee has ever suffered radioactive casualties. Some people in foreign countries have made this prediction: If the accidents and environmental pollution caused by a normally operating nuclear power station are taken into account, including the whole process from fuel excavation, manufacturing, and transportation to generating electricity, waste material processing, and even dismantling the station, the casualties caused by the nuclear power system are still lower than those caused by the coal power system. We can say that nuclear power is safe and clean energy.

Instead of dealing with nuclear power, thermal power, and hydropower in general terms, it is necessary to specifically analyze them.

First, the distribution of China's coal and water resources is not even. Sixty percent of its coal resources are in the northern region, 70 percent of its water resources are in the southwestern region, and only 10 percent of its energy resources are in the coastal provinces and cities and the northeastern region, whose industrial output value accounts for 70 percent of the country's total. Naturally, regions rich in coal and water resources should energetically develop coal power and hydropower stations. But what about the eastern, southern, and northeastern regions, which are poor in coal and water resources?

The first problem we face in developing thermal power stations is the difficulty in transporting coal from distant places and the difficulty in expanding the construction of railways and harbors. The second problem is that fuel production costs will rise. Introducing hydropower stations from other places also faces the problem of long-distance transportation. The construction of long-distance transmission lines requires a large investment and the loss of electricity on long-distance transmission lines is very big. It seems that a better method is to develop nuclear power stations. The superiority of nuclear power stations will manifest itself in regions remote from industrial chemicals producing areas or areas where coal prices are high.

Second, it is true that the capital construction of a nuclear power station requires more investment than that of a coal power station, but they require practically the same comprehensive investment in building the electric power system. Although the fuel for a nuclear power station is transported from distant places, it is in small quantity. What is more important is that the production cost of a nuclear power station is much lower than that of a thermal power station. Figures recently disclosed in foreign countries show that the production costs of nuclear power stations in countries like the United States, France, the FRG, and Canada are one-third lower than those of thermal power stations. Although the capital construction of a nuclear power station requires much investment, it will not take long to recover the investment.

Third, developing nuclear power stations will save a large amount of coal and oil, which are used for processing industrial chemicals. China lacks not only energy, but also industrial chemicals. Coal and crude oil are valuable materials for processing industrial chemicals. We have no alternative but to use coal and crude oil as fuels for generating electricity. If we could save some coal and crude oil for intensive processing in the chemical industry, economic results would be better. Coal and oil are not reproductive energy. For the sake of our descendants, we should do our best to save coal and oil.

The number of nuclear power stations in the world has increased rapidly over the last 10 years. Statistics in the magazine "FRG ATOMIC ECONOMY AND ATOMIC TECHNOLOGY" in

August 1982 revealed that there were 273 nuclear power stations operating in the world with an installed capacity of 170 million kilowatts. There were 229 nuclear power stations under construction and 115 more were being planned. The proportion of nuclear power in world energy is rapidly rising. It is estimated that nuclear generated energy will account for 20 to 30 percent of the world's total electric energy production. At a conference in Venice in June 1980 leaders of seven Western industrialized countries stated that their countries would energetically develop nuclear power stations. Former U.S. President Carter pointed out long ago that coal and nuclear energies would be the main pillars of U.S. energy. In 1979 the Soviet Union decided that the country would increase its electric capacity tenfold in the coming 10 years. France has planned to build nuclear power stations generating 40 million kilowatts of power by 1985. Developing countries like India, Romania, Finland, Spain, Argentina, Brazil, and Mexico are also energetically developing nuclear power stations. Taiwan Province, China, has a plan to develop 15 million to 25 million kilowatt nuclear power stations within this century. Now the operational capacity of Taiwan's nuclear reactor furnaces ranks 10th in the world.

Apart from the rising price of oil and the shortage of energy, the fundamental reason why various countries in the world are speeding up the construction of nuclear power stations is that nuclear power stations have matured in technology and can compete with thermal power stations in economy.

Viewed from the angle of technological progress, it is necessary to speed up the construction of nuclear power stations. At the Fifth Session of the Fifth NPC, Comrade Zhao Ziyang pointed out that within 20 years, it would be necessary for China's various national economic departments to gradually adopt the advanced technology which is suited to China and which was popularized in economically developed countries in the 1970's or the early 1980's. This is a major strategic measure for speeding up China's technological progress. Comrade Zhao Ziyang's instruction also refers to the use of atomic energy. The suggestion on developing nuclear power stations was made many years ago, but due to long-term hesitation, much time has been wasted. In the use of atomic energy to generate electricity, the gap between China and technologically advanced countries has become wider. It is high time that we made up our minds to catch up with them. If we had started building nuclear power stations when we succeeded in our experiments with nuclear power reactors, we would not have lagged far behind technologically advanced countries in developing nuclear power stations. We must bear this lesson in mind.

Now electric power has become a weak link in national economic development. The more concentrated industry is, the less the supply of coal and electric power. Even Shenyang, Dalian, and Harbin, where industry is concentrated, are seriously short of power, to say nothing of the eight provinces and cities in the south. A report filed by Shanghai pointed out that the 200 factories which limit their production due to the shortage of power can be put into full operation by importing coal from abroad. Income from this can be used not only to repay the prices of coal, but also to deliver profits. In this case, it is not necessary for the state to provide loans. At present the coal which has been produced cannot be transported. So factories limit their production, and industry contends with agriculture for electricity due to the shortage of power supply. The shortage of energy shows that developing nuclear power stations has become quite an urgent task.

CSO: 5100,4129

PEOPLE'S REPUBLIC OF CHINA

PRC, JAPAN END 4TH ROUND OF NUCLEAR TALKS

OW201919 Beijing XINHUA in English 1900 GMT 20 Dec 84

[Text] Tokyo, December 20 (XINHUA) -- The fourth round of Sino-Japanese talks on a cooperation agreement on the peaceful use of nuclear energy ended its four-day session here today with much progress.

During the talks, the two sides, which were represented respectively by Jia Yuwen, member of the State Science and Technology Commission of China, and K. Matsuda, deputy vice-foreign minister for science and technology of Japan, reached identical views on a number of questions in the spirit of equality, mutual benefit, mutual understanding and accommodation.

However, there are still questions yet to be solved through further negotiations. For these, the two sides agreed to hold the fifth round of talks in Beijing in the near future.

CSO: 5100/4129

PEOPLE'S REPUBLIC OF CHINA

KYODO REPORT ON PRC-JAPAN NUCLEAR TALKS

OW201237 Tokyo KYODO in English 1232 GMT 20 Dec 84

[Text] Tokyo, Dec. 20 KYODO -- Japan and China failed to agree on the contents of a proposed agreement on nuclear energy cooperation during consultation which ended in Tokyo Thursday, Japanese officials said. Conclusion of the bilateral agreement was postponed until next consultation to be held in Beijing next spring, at the earliest, they said.

The differences in their positions largely concerned inspection of China's nuclear facilities by the International Atomic Energy Agency (IAEA), the officials said. Chinese delegates basically agreed to accept the inspection -- a step to ensure that China's nuclear facilities would be used only for nonmilitary purposes. But they asserted, at the same time, that the agreement should include a clause ensuring independence of the country's policy on peaceful use of nuclear energy, according to the officials.

Japan claimed that steps to guarantee the peaceful use should be written in the document in a clear-cut manner, they said.

The conclusion of a nuclear agreement between the two countries was first proposed at a Japan-China ministerial conference held in September of last year in Beijing.

Jia Yuwen, member of the State Scientific and Technological Commission, headed the Chinese delegation to the four-day Tokyo consultation.

CSO: 5100/4129

PEOPLE'S REPUBLIC OF CHINA

BRIEFS

INAUGURATION OF NUCLEAR SOCIETY--Beijing, 18 Dec (XINHUA)--The Beijing Nuclear Society was inaugurated today. Speaking at the inaugural meeting, Jiang Shengjie, director of the State Bureau of Nuclear Safety and president of the China Nuclear Society, said: The purpose of establishing the society is to centralize the scattered nuclear scientific research forces, and tap their potential, in order to contribute more to building the capital and benefiting the people. There is a relatively large number of nuclear scientific research forces in Beijing. However, due to barriers between departments, we have been unable to bring into full play the role of the forces in the economic construction of the capital. Jiang Shengjie pointed out that the inauguration of the society and its future work would improve the situation, as well as give an impetus to all nuclear, scientific research forces in the country, in providing better service for the national economy. At the inaugural meeting, nuclear experts submitted papers which contain specific suggestions for utilizing nuclear energy in building capital, including development of nuclear medicine, popularization of irradiation technology in the food industry, and improvement of the effectiveness of the existing nuclear facilities. [By Zhuo Peirong] [Text] [Beijing XINHUA Domestic Service in Chinese 1257 GMT 18 Dec 84]

CSO: 5100/4127

CANADA

PICKERING GENERATOR LEAK OF HYDRAULIC FLUID REPORTED

Ottawa THE CITIZEN in English 14 Dec 84 p A20

[Text]

AJAX, Ont. (CP) — A leak of a poisonous fluid from the Pickering nuclear generating station last weekend resulted in the shutdown of the Ajax water plant.

The leak of 77 litres of synthetic hydraulic fluid called tri-arylphosphate occurred over a 30-hour period. The fluid opens and closes giant valves that control the amount of steam entering the turbine in unit 7.

The leak occurred in unit 7, one of four new nuclear generating units now in various stages of completion in the "B" section of the Pickering plant, Hydro spokesman Jack Muir said.

The hydraulic fluid leaked from the valve onto the floor of the turbine building and then into sump holes from where it was pumped into the lake, Muir said.

The fluid would be toxic in very high concentrations, Muir said, but it is not a health hazard when diluted in the lake.

The fluid breaks down in water and is not considered to be a health hazard unless it becomes "vaporised in air," he said.

"If you drank any motor oil of this sort, you would be in trouble," he said.

This particular unit is going through tests that will result in its licensing by the Atomic Energy Control Board. Since the leak, the sump holes have been plugged up to prevent a similar incident, Muir added.

At no time was there any danger of a radioactive material being released into the environment, Muir said, and officials from the provincial Ministry of the Environment said the leak was not serious enough for a general public health warning.

But they did monitor the water entering nearby water filtration plants for two days, after the spill.

CSO: 5120/9

CANADA

BRIEFS

NUCLEAR ACCORD WITH EC--BRUSSELS (CDJ)--Canada and the European Community (EC) have agreed to extend their accord on nuclear engineering for a minimum of 20 years, an EC commission spokesman says. The 1959 agreement, which has been extended in the past for only short periods, covers the supply of nuclear materials, the security of those supplies and exchange of information on the nuclear sector. [Text] [Ottawa THE CITIZEN in English 14 Dec 84 p A20]

TURKISH REACTOR PROPOSAL--Atomic Energy of Canada Ltd. is studying a proposal from the Turkish government that would see the federal agency own and operate its first Turkish reactor, the chairman of Atomic Energy confirmed Monday. The proposal was made to Atomic Energy, the federal government's sales arm for Candu reactors, this fall but until now the agency has refused to confirm it. Based on the costs of comparable 600-megawatt reactors, a deal with Turkey could be worth as much as $1.5 billion. In all other foreign reactor sales, Atomic Energy has sold the reactor to the purchaser. Under the Turkish proposal, Atomic Energy would continue to own the reactor and would recover its costs by selling power to the Turkish electrical utility. [Text] [Ottawa THE CITIZEN in English 27 Nov 84 p A17]

CSO: 5120/9

ARGENTINA

ADVANTAGES TO ACCEPTING NUCLEAR SAFEGUARDS VIEWED

Buenos Aires LA PRENSA in Spanish 1 Nov 84 p 9

[Article by Bolbino A. Alvarez]

[Text] The issue of nuclear energy, or to be more specific, of Argentina's atom bomb, is a political matter in the context of international relations, but as with any political issue, there are some underlying vital interests of a strategic and economic nature.

The Safeguards

Argentina's refusal to sign the nuclear safeguards agreement contaminated from the start relations with the western powers, especially with the United States, and this refusal was not a significant factor in the program's success. This seems to be demonstrated by the fact that countries which did sign the nuclear safeguards treaty, such as West Germany, Canada, and Holland, have attained very high levels in this field, and are actually our major suppliers of technology. In addition, considering the close alignment of these countries with the United States, it can not be denied that if the U.S. had really voiced any strong opposition, they would not have dared to contradict it on such a vital issue. This would seem to indicate--though it occurs to all of us that this is not so, because we always assume that the United States is acting in bad faith--that in this instance the United States might be sincere and truly only want to control the military use of nuclear energy, and not to oppose high levels of development, so long as there is no danger of transgressing the limits of peaceful use.

Of course, this question immediately arises: but what about our sovereign decision? To this, which is a valid question, there are a number of possible answers, but there will never be agreement on this point unless we start by recognizing that in some areas, absolute values are impossible. In the first place, all

treaties imply individual limitations, in exchange for a search for a higher good. We can't stop reacting negatively to any form of discrimination, though we should realize that we are not the only ones affected, and that on this critical point we are in the company of a good many other countries, including some top-level powers, such as Japan, Germany, Canada, etc. The United Nations' veto system is also discriminatory, yet would it be wise to change it?

Going further into this issue, and even aside from the use of its most powerful forms, one thing can not be denied: nuclear power is so devastating that it can not be left in unsafe or dubious hands, in countries still in a state of unreadiness, with an immature ruling class or under the command of fanatics of any type.

There exists an international order, whose scale of values is not always just, and which has not managed to avoid some tremendous conflicts, but which has served to keep the earth still a liveable place. Ignoring this would mean stepping outside the positive course of history.

The Interaction of Forces and Interests

Perhaps we may at times confuse perseverance with obstinacy, courage with rashness, and in so doing, we may forget our true national objectives, which can be achieved without any detriment to our dignity. Negotiating differences is neither unpatriotic nor unethical. Where would Germany, Japan, and Italy, the countries defeated in World War II, as well as all the other nations defeated in so many conflicts, be today if they had held out stubbornly in the always dramatic, difficult, and humiliating negotiations with the victors?

We are citing these extreme cases so that we can show Argentina's position more clearly. Argentina, far from being a defeated country, provides an example of a genuine restoration of democracy, the result of its people's and its leaders' maturity. Nonetheless, an infatuation with democracy may lead us to a certain spirit of "triumphalism" which might detach us from reality, delaying our inevitable and clear positioning in the world arena. This would bring about the neutralization of this exceptional hour in Argentina's history. We should take up again the legacy of our founders, that great internal force that spurred on the most courageous achievements. The present retreat within our borders must stop,as must another, even more damaging form of retreat--a shift toward a few centers of attraction. This

has been caused by inconsistent and damaging policies, which leave emptiness not only in the international area, but also within our own territory.

While we have been moving away from any external interests, we have also worked and we are continuing to work without ceasing, as if trying to create for ourselves a stubborn and not very reliable image (not entirely unmerited). Contributing to this negative image have been our position in relation to the Nazi-Fascist Axis; our policy immediately following that period, which has continued with some brief exceptions; and our present indecisiveness.

The Axis countries, after waging a fierce war, were reconciled with their conquerors and now for quite a long time have been their closest allies. We, however, have still not managed to work out our minor differences, and we always find excuses for new confrontations that hold us back and place us in danger, while at the same time they strengthen our geopolitical adversaries. There can be no question of tolerating insults, but we must convince ourselves--though it may appear so obvious--that we are part of the world, and not the whole world; we must realize that there are intelligent and astute people and many courageous people in the world aside from ourselves (despite the fact that some demagogues have led us to believe the contrary for years). "Paper tigers" do have sharp claws, and the first to realize this was the very nation whose leader first coined the phrase. That once omnipotent ruler is today almost forgotten, while his country has begun to travel the path of progress, opening up new ways that have broken free from its harmful isolation. And that doesn't mean it has renounced its destiny. When will we once again come to realize that the interaction of forces and interests--whether for good or evil--has been the axis around which relations between peoples have always rotated, and that not even victorious powers have been able to impose their arrogance or their whims without paying an exorbitant price?

The Keys to this Harassment

If we review the harassment of which our country has been the target for many years, we find that while Argentina was attacked during the time of the de facto government for human rights issues, before that we were branded as backward, when not actually labelled Nazi-Fascists (even though our people were never Nazis or Fascists). Our critics were not interested in the possibility of a constitutional government, since their purpose was this campaign of denigration, conducted by inventing arguments or by making use of halftruths. Observing the behavior of our critics

in relation to other nations, or simply our neighbors, is enough or more than enough. The Brazilian, Chilean, and Paraguayan dictatorships have not been bothered very much because they responded in a docile manner to the pro-Atlantic interests and also because their anti-Argentine biases and ambitions made them a useful weapon to be held in reserve for any emergency. This was proven during the battles in the southern archipelago. And in addition--and this is an essential point--because those countries, given their characteristics, do not pose a threat to the commercial and strategic interests of the nuclear and computer age, no matter how much Brazil may work and dream. But Argentina, in addition to its highly capable population and its ability to produce exceptional workers in all areas of the arts and sciences, has large uranium reserves, as well as petroleum, gas, and mineral resources. And as if that were nothing at all, it is also a major producer of food at low cost. It has been said that this could make Argentina the Japan of foods, if it so decided, and without harming its destiny as a high-tech manufacturer.

Now, in turning our glance toward the glorious exploits in the Falklands--no circumstances can alter that glory--we again see the relation between what was said above and the behavior of England and the United States, as well as of our self-interested neighbors. The keys may well be the danger of strong Argentine competition in highly sensitive markets in Latin America, the Pacific basin, Africa, etc. But this, though important, still doesn't seem to be the heart of the problem, which may well center on the strong lack of confidence which has persisted for many years. This has been caused by the unpredictable nature of our foreign policy, and confirmed by our obstinate refusal to sign the nuclear safeguards, an issue on which the United States has a real obsession. All this may help to explain in some way the attempts to hold us back so long as we have not defined a firm course within the west, without detriment to good relations with the east and nonaligned countries. Democracy by itself will not provide solutions for national problems; we need the aggregate of concrete and convincing facts. Other countries also make prodigal use of rhetoric, but when the time for action comes, they always give priority to their own interests. Just look at Spain's behavior on fishing issues.

Nuclear Devices

People have been saying for years that Argentina is capable of producing and detonating a nuclear device. As Argentines, this gives us cause for pride, as it indicates that we can be one of the nations dominating the most sophisticated high-tech fields.

Nonetheless, when some groups maintain that it would be wise to actually produce a nuclear device, the issue sets off a heated controversy. There are some people who believe we should not sign any safeguard agreements, but should act to manufacture a bomb without further delay. Hypothetically, that would put us out in front of Latin America and preserve our sovereign decision-making powers, and would also hold out some other very attractive prospects.

The Example of Paraguay

In some ways, Argentina today is in a position similar to that of Paraguay in the 19th century. There was a fleeting moment when the spirit of its people and the ability of its leaders placed Paraguay at the forefront of Latin America, as a country producing both wealth and goods that were sophisticated for that time. But it probably lacked the internal equilibrium of which Ludwig speaks in his HISTORY OF GERMANY, and it acted with a certain amount of arrogance, challenging too early interests and forces that were out of proportion with its resources, thus giving some cause for a campaign to be plotted against it, a campaign that culminated in genocide--from which Paraguay has not yet recovered today--a campaign conceived by the dominant power and carried out by its fraternal neighbors.

The atom bomb could place us in a situation of both privilege and danger, unless we act with wisdom, intelligence, and greatness. Let us draw some conclusions from the example of Paraguay. Chile's territorial ambitions will continue to flare up, and it will not leave our borders in peace, so that it may have a screen and a site for direct and rapid penetration, if necessary, aside from whatever may happen with the Beagle Channel. Brazil will continue to put pressure on all its borders, and will quickly move to occupy internal spaces. Given this prospect, it might well appear that the sooner we can produce our bomb, the better! But our bomb, in itself and by itself, and for the reasons already cited, would be a very extraordinary feat: producing it a real going to extremes, with all its attendant risks, risks that we would not be capable of handling in any way.

The Argentine Future

We believe that there are other ways: none is easy; all are full of risks, but they are still much safer than that one. Our differences with the major powers can be negotiated and eliminated; the nuclear safeguards will have to be signed, just as a majority of nations have already signed them, and without attempting

to introduce absurd inventions that won't satisfy anyone, such as the regional controls of which there has been much talk recently. We can also negotiate with our neighbors, although our position with them will continue to be weak until our quarrels with the west have been worked out. By resolving the central issue with the Atlantic powers, Brazil and Chile, and even Paraguay, which today claim to be containing us, would lose some of their impact, and would have to negotiate on a fraternal basis the disputes that now separate us. These disputes do not arise so much from our mistakes, but from the insatiable expansionist ambitions of the first two of these nations.

On the contrary, the production of an Argentine bomb would entail--along with the economic and strategic factors already mentioned--an immediate reaction by the central powers and by the entire Southern Cone. The potential disequilibrium that would be created could not be tolerated, either by the nearby governments or by the Atlantic strategists, and would be corrected by the United States in its peculiar manner. It would provide Brazil with nuclear bombs and vectors, and would probably arrange for England (because of its South Atlantic connection) to do the same for Chile. So Argentina's preponderance would be quite ephemeral. Some serious and inevitable problems would immediately arise, the first being an imperious need for ideological definition which, no matter what the options might be, would be totally negative for us, since "humiliated and offended," we would have to side with the west, with almost no margin for negotiation, or move over to become a satellite of Russia, if Russia decided to ignore the Yalta agreements and accept us in its embrace. Even though this might seem to be an exaggeration, we too would begin to live under the nuclear button, with which our beloved neighbors had been provided at no cost. Though we know that they wouldn't be allowed to push that button, or to make a decision on its use, everything would still change.

As bad examples tend to multiply, and interests as well, Peru would not be willing to remain unarmed if Chile were armed; nor would Venezuela agree to remain without weapons in facing a possible confrontation with Colombia, and even poor Bolivia would also try to get its own bomb (alerted to the great strategic importance of its territory). All this would cause tremendous ideological and economic chaos, since they would go after their bombs in any way they could, once the race had begun. And just as now we buy old, "leftover" conventional weapons, later old atom bombs would be purchased. But those old bombs would still be enough to keep us living in terror, and we would slip further downward on the slope into poverty. That is what will happen to Latin America if we build an Argentine bomb.

Stopping this conclusively and putting an end to the haggling about safeguards, by signing them immediately--apart from freeing large amounts of money for the peaceful and unrestricted development of nuclear energy, which is one of the true challenges we face--would help us avoid the most serious trap hindering Argentina's progress toward a vital future. This would also clear the way for negotiations on our foreign debt and on many other problems that seem to have no connection with this issue. And it would let us create the nation portrayed in the preamble of our National Constitution.

Note 1: We persist in our belief that the center of gravity of the Argentine problem of today is the payment of our foreign debt, but we are also convinced that there will be no satisfactory settlement or reintegration in the west until the nuclear safeguards issue has been resolved.

Note 2: In preparing this report, we disregarded the hypothesis that Brazil or Chile may produce its own nuclear bomb. This would not in any way alter our conclusions, for very obvious reasons.

7679
CSO: 5100/2026

ARGENTINA

NEUQUEN, RIO NEGRO GOVERNORS CALL FOR NUCLEAR FREE ZONES

Bahia Blanca LA NUEVA PROVINCIA in Spanish 17 Oct 84 p 10

[Text] General Roca. A group of well known persons from Neuquen and Rio Negro, including the governors, have issued a statement "appealing to our national conscience" to remember that "the creation of zones free from nuclear weapons may contribute to the safety of people living in those areas, to the prevention of the proliferation of nuclear weapons, and to the attainment of the objective of a general and complete disarmament."

This statement was signed by the governor of Rio Negro, Osvaldo Alvarez Guerrero, and by the governor of Neuquen, Felipe Sapag; by the bishops of Viedma and Neuquen, Msgrs Miguel Hesayne and Jaime de Nevares; by the secretary general of the CGTR [expansion unknown] of Rio Negro, Eduardo Fernandez Novoa; and by the director of the local paper, RIO NEGRO, and member of the provincial human rights commission, Julio Rajneri.

Also signing the statement were the president of the University of Comahue, Aristides Romero; leaders of the Radical Party, of Christian Democracy, and of the Development Party; scientists from the Bariloche Atomic Center; the national senator Antonio Napoli, and other national and provincial legislators.

The statement, entitled "Neuquen and Rio Negro on the Nuclear Issue," says that "Argentina, which has reached a level bringing it nearer a greater mastery of nuclear power, must seriously reflect on its new responsibilities," since "an increase in power and knowledge without prudence and control could be terrifying."

It also says that "safety in the peaceful use of nuclear energy is an imperative for all people concerned about the cause of peace; the military denuclearization of Latin America is an important and vital step forward toward this goal."

The statement maintains that "the acceptance by sovereign governments of the international verification of nuclear facilities, for the first time in history, is a unique change, and one which sets a precedent for the behavior of states."

"What is needed," it continues, "is not a sacrifice of national interests, but rather a more accurate evaluation of what those interests entail."

To meet this objective, "the guarantees granted by the countries involved must be credible. It isn't enough that they be effective; they must also appear to be so. We must replace distrust and mutual suspicion between nations by a desire for cooperation and mutual support."

The signers conclude with an appeal "to our national conscience to stimulate and support actions by our country founded on the conviction that the creation of zones free from nuclear weapons may contribute to the safety of people living in those areas, to the prevention of the proliferation of nuclear weapons, and to the attainment of the objective of a general and complete disarmament."

7679
CSO: 5100/2026

BRAZIL

NUCLEBRAS PRESIDENT REVEALS PILOT PLANT PLANS

PY120130 Brasilia Domestic Service in Portuguese 2200 GMT 11 Jan 85

[Text] Nuclebras President Dario Gomes today announced that in 2 years two pilot plants for the utilization of uranium ore from the Itataia mine, in the municipality of Santa Quiteria, in Ceara State, will be in operation. He explained that the second phase of the undertaking will begin thereafter, aimed at the production of 2,000 tons of yellow cake and 300,000 tons of phosphoric acid. The Itataia deposits, located 200 km from Fortaleza, are the country's largest, and one of the world's largest as well, with reserves estimated at 142,500 tons of uranium oxide.

Next Thursday, 17 January, Mines and Energy Minister Cesar Cals will visit the Admiral Alvaro Alberto Nuclear Complex in Angra dos Reis, Rio de Janeiro, he will inspect all of its installations, beginning with those of Angra I, that are in operation. Then he will visit the construction sites of Angra II and Angra III, and the Nuclear Complex Information Center.

Minister Cals will also meet with experts of Nuclebras and Furnas Electricity Company, who will brief him on the nuclear projects. Nuclebras President Dario Gomes will give a speech on the development of the Brazilian nuclear program, focusing on the accomplishments and prospects for the coming years. Members of the Brazilian Electric Power [Electrobras] administration council, led by its president General Costa Cavalcanti, will also be in Angra dos Reis on Thursday, 17 January.

CSO: 5100/2052

BRAZIL

NAVY MAY HAVE NUCLEAR SUBMARINE BY 1990

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Dec 84 p 5

[Text] Adm Alfredo Karam, minister of the navy, admitted yesterday in Rio that one of the three submarines to be built under the Naval Reequipment Plan could be adapted for nuclear propulsion in the future. This should happen by the beginning of the 1990's, when complete mastery of the reactor technology is assured.

The minister noted that construction of the first submarine is scheduled to begin early next year in the FRG and the other two will be built in Brazil; one of these will be similar to the one built in the FRG and the other one will be from a national design by the Navy Office of Engineering.

Karam was speaking at the ceremony to install Adm Carlos do Albuquerque as commander of the marine corps [CFN]. The minister confirmed that the reequipment plan also provides for construction of a new aircraft carrier to replace the "Minas Gerais," which has been in service for more than 40 years.

The minister will lunch today at the Naval War School with ranking admiralty officers, when he will assess his administration during this year. He said that "this assessment may or may not be released; no judgment has been made yet."

Message

Assuming command of the Marine Corps, Carlos do Albuquerque said that "before a man is trained professionally as a marine, it is fundamental that he be trained as a soldier-citizen, imbued with unshakeable faith in the worth of his corps and a real sense of his part in Brazilian society."

The admiral said that the marine must "spurn the temptation of any false incentives, even in the most deceptive forms." According to the new Marine Corps commander, "the observation of such negative actions, veiled or open, must be taken into consideration by each one of us and duly combated, neutralized and deflected by conviction in the true values on which the character of the real Brazilian military man, particularly the marine, is based."

Strategic Force

Adm Domingos de Mattos Cortez, who completed his term of active service and relinquished his post as commander of the Marine Corps, said: "I belong to a generation which helped to build the modern Marine Corps, the product of a revolution in thought, process and methods which enabled the Navy to have a strategic force, proud of its tradition, aware of its importance, its worth and its professionalism."

Admiral Cortez declared that the marine is "acutely aware of having made a substantive contribution to Brazilian naval power, without taking anything away from it." The admiral cited former Minister Maximiano da Fonseca and the president of the republic "for the page which they have added to the history of the CFN."

Attending the installation ceremony for the new commander of the CFN were Adm Arthur Ricart da Costa, navy chief of staff; Adm Henrique Saboia, general director of marine personnel; Adm Mario da Fonseca Hermes, general director of materiel; Adm Jose Maria do Amaral Oliveira, commander of naval operations; and Adm Lins Leal Ferreira, secretary general.

6362
CSO: 3342/71

BRAZIL

TITANIUM CONCENTRATION PRODUCTION TO BE 150,000 TONS BY 1987

Rio de Janeiro GAZETA MERCANTIL in Portuguese 18 Dec 84 p 11

[Article by Sergio Danilo]

[Text] Rio--Sources from the Vale do Rio Doce Company (CVRD) informed this newspaper Friday that the project of its industrial unit to produce 150,000 tons of titanium concentrate beginning in 1987 will be completed by March 1985. In January, the CVRD will export another 2,000 tons of anastase concentrate (titanium ore) to the American Du Pont Company, which received a similar quantity last November to conduct industrial tests with the mineral from which the "white pigments" used in paints and varnishes are industrialized.

According to the source, the Andrade Gutierrez Company of Minas Gerais has already received the authorization of the Industrial Development Council (CDI) to install the first titanium pigment factory in Uberaba, Minas Gerais, beginning in 1988. And Du Pont plans to install another plant in 1989. With those projects, one of the most modern industrial complexes for the production of titanium, the application of which has been expanded in the military and aerospace industry, will be born in the Minas Triangle. The process for obtaining titanium from anastase (a mineral found only in Brazil) was created by the CVRD itself, which in 10 years spent $20 million in its mineral research laboratories in Minas Gerais.

Until then, titanium was obtained from a mineral found in Australia--rutile, the Brazilian reserves of which are not very large and the world reserves of which are being depleted. The CVRD in Tapira (Minas Gerais) produces 15,000 tons of titanium annually, using the "chloride" process for rich ores. For that purpose, the company made an agreement with the Aeronautic Technology Center in Sao Jose dos Campos, which is adapting the method for the production of that metal at reduced costs. At the same time, the CVRD is conducting studies on a new process of "electrolysis in liquefied salt" developed by the School of Chemistry of Paris and by the University of Sergipe.

8711
CSO: 5100/2051

ANGRA I NUCLEAR POWER PLANT TO BEGIN OPERATION

PY280240 Sao Paulo FOLHA DE SAO PAULO in Portuguese 27 Dec 84 p 13

[Text] Brasilia--Brazilian Mines and Energy Minister Cesar Cals has reported that the Angra I nuclear power plant will be officially dedicated on 17 January, because all the final tests permitting the power plant to operate at the full capacity of 626 megawatts have been satisfactory. The construction of the power plant, which began in 1972, has been delayed because of a number of problems both with the buildings and the operation of equipment supplied by the U.S. Westinghouse Corporation.

Nuclebras President Dario Gomes said that Brazil has now mastered the nuclear cycle, starting from the construction of nuclear power plants all the way to the production of fuel. According to Gomes, the progress attained in this area is set forth in a report which will be delivered to the incoming government.

Gomes said that the process of technology transfer provided for in the Brazilian-FRG accord is practically completed. The uranium enrichment plant of Resende (Rio de Janeiro) will go into operation in February 1985 and is scheduled to begin enriching uranium at 1 percent during the second half of the same year. Furthermore, the country will be able to process uranium at 3 percent in the short term.

CSO: 5100/2046

SALE OF 75 PERCENT OF NUCLEP CAPITAL TO FRG RECOMMENDED

Rio de Janeiro GAZETA MERCANTIL in Portuguese 27 Dec 84 p 4

[Article by Joaquim Francisco de Carvalho, former director of NUCLEBRAS Engineering Corporation (NUCLEN)]

[Text] In an article published in this newspaper on 3 July 1981, I showed that the construction of the NUCLEBRAS Heavy Equipment Corporation (NUCLEP) was a serious planning error committed by the negotiators on the Brazilian side and at the same time a clever strategem employed by the European consortium associated with NUCLEBRAS in the undertaking (KWU, GHH and Voest) to force us to speed up implementation of the Brazil-Germany nuclear agreement because, obviously, NUCLEP's viability depends on the orders stemming from construction of the nuclear plants. And, as everyone knows, KWU, GHH and Voest--in addition to having earned piles of money because they were responsible for the "procurement and follow-up" of the imported equipment installed there--will also be big direct suppliers of equipment and services for the nuclear plants provided for in the Brazil-Germany agreement.

Now the KWU representative in Brazil, Wolfgang Brayer, declares publicly that "those who say that NUCLEP has not had any significant orders other than the containment vessel for Atucha-II are not in touch with reality. Suffice it to go to the factory to see that at this moment, it is building the reactor vessel and the steam generators for Iguape-I, besides the eight accumulators and the condensor for the Angra-II turbine and the Angra-III pressurizer."

Let us analyze Mister Brayer's statement part by part. With regard to the heavy components for Iguape-I, this is "spontaneous generation" by NUCLEP itself because nobody has ordered them, as is demonstrated by various statements by Brazilian officials belonging to the federal and Sao Paulo state governments to the effect that the electric sector does not need nuclear plants until the year 2000, simply because there is still an enormous hydroelectric potential to be utilized at costs three to four times lower for equivalent power.

Mark well the web of interests adverse to Brazil in which we were enveloped by the folly of our negotiators in the Brazil-Germany agreement, who gratuitously handed over instruments permitting KWU, by unilateral decision, to take the initiative to manufacture heavy components for unnecessary nuclear plants and,

thereby, to exercise influence on the scheduling of investments for the Brazilian electric sector.

With regard to the accumulators and the condensor for Angra-II as well as the pressurizer for Angra-III, I am certain that the manufacture of those components should be turned over to Brazilian private establishments such as Confab, Vibasa, Jaragua, Cobrasma, Badoni, etc. To build them in NUCLEP means aggravating the problem of the idle capacity that threatens with collapse a good part of our heavy boiler and mechanical construction industry, which took many decades to establish and cost great human and financial effort.

Anything that is done in NUCLEP--which was designed to produce cylindrical parts of great dimensions and weights in the order of hundreds of tons--will redound in direct or indirect loss to Brazil, although it may be profitable for the European consortium which, according to the Central Bank, applied as direct investment in the undertaking an amount much smaller than it would have to apply to deserve the 25 percent of the company's capital in which it actually is entitled.

What to do then?

Big investment and finance specialists, such as Brealey and Myers, authors of the excellent book, "Principles of Corporate Finance" (McGraw-Hill), give a simple prescription: "Sunk costs are like spilt milk; forget them."

However, there is a more interesting alternative to be explored, which would be to sell the 75 percent of NUCLEP capital that belongs to NUCLEBRAS to the European consortium or to KWU alone.

NUCLEP can be very useful to the European consortium and KWU in international bids for the construction of nuclear plants because the small direct investment they made would enable them to offer heavy components below cost and, thus, to occupy an advantageous position vis-a-vis other competitors, from the outset.

From the national point of view, it would not be at all important if NUCLEP's capital were foreign. After all, there are other heavy boiler establishments in that situation, such as Mecanica Pesada and Ishibras, to cite only those.

It, therefore, seems logical that the best thing to do with NUCLEP would be to propose to the German bankers connected with Siemens (which holds 100 percent of KWU) converting part of NUCLEBRAS' debt to them into direct investment in NUCLEP.

8711
CSO: 5100/2051

BRIEFS

CALS ON URANIUM FUTURE--Itataia, Ceara--Presiding over the ceremony marking the beginning of work on the pilot plant that will produce uranium concentrate at the uranium-bearing deposit of Itataia, 200 kilometers from Fortaleza, Mines and Energy Minister Cesar Cals said in that city yesterday that in the nineties "Brazil will have more power than the oil-producing countries." The industrialized world will need us because its energy will be generated by nuclear power, added Minister Cesar Cals, speaking at the brief ceremony that was attended by the president of NUCLEBRAS, Dario Gomes, Senator Virgilio Tavora and industrialist Edson Queiroz Filho, among others. [Text] [Brasilia CORREIO BRAZILIENSE in Portuguese 29 Dec 84 p 9] 8711

TECHNOLOGY TRANSFER, 1985 LOANS--In an interview with the BRAZILIAN NEWS AGENCY (EBN), the president of the Brazilian Nuclear Corporation (NUCLEBRAS), declared that "in a general way, the goals have been achieved. What was programmed 10 years ago has gradually been attained." He believes that with another 2 or 3 years in the fuel cycle portion, another 3 or 4 years in the area of component construction, and with two more nuclear plants built (four all together), "we will have obtained all of the technology transfer." Dario Gomes said that NUCLEBRAS gets loans abroad to pay for its new investments, to cover its debt service and to pay for the amortization of previous purchases. He revealed, that foreign loans totaling $570 million are anticipated next year. With reference to mineral exploration, Gomes explained that "in 1975, we had about 10,000 tons of uranium explored and today we already have 301,000 tons" and the certainty that this figure can increase considerably "if we undertake a better definition of our deposits." With regard to uranium concentrate or "yellow cake" produced in the beneficiation plants near the uranium mines, as is the case of Pocos de Caldas, he said that it is already being exported to Argentina and Europe. [Text] [Rio de Janeiro GAZETA MERCANTIL in Portuguese 27 Dec 84 p 12] 8711

URANIUM FROM PHOSPHATE SEPARATION PLANNED--Mines and Energy Minister Cesar Cals and Nuclebras President Mario Gomes today presided over the signing ceremony of a contract between Nuclebras and Petrofertil, a Petrobras subsidiary, for the construction of a test plant to separate uranium from phosphate. This took place at the Itatiaia mine in Santa Quiteria municipality, 211 km from Fortaleza. Minister Cesar Cals told the BRAZILIAN NEWS AGENCY that this project is not only important for the State of Ceara, but mainly Brazil, because this represents one more step on the way to mastering the nuclear cycle. This will set Brazil on a position of equality with other more developed countries, he said. The minister believes that in the future, the countries that have nuclear technology will have greater trading power than those countries that exploit oil. [Excerpt] [Brasilia Domestic Service in Portuguese 2200 GMT 28 Dec 84 PY]

CSO: 5100/2047

BRIEFS

BAEC EXTENDS ACTIVITIES--The Directors of the Bangladesh Atomic Energy Commission (BAEC) have agreed to expand the area of activities of the organisation to cover related technological development including electronics, computer sciences, material science and renewable energy. This was agreed at the 7th meeting of the Directors held on Saturday with Dr Anwar Hussain, Chairman of BAEC on the chair. The meeting also discussed research programmes, projects to be taken up during Third plan period, manpower development and commercialisation of the research findings of the BAEC. [Text] [Dhaka THE BANGLADESH TIMES in English 26 Nov 84 p 3]

CSO: 5150/0015

PROGRESS IN NUCLEAR FIELD OUTLINED

London AL-AHRAM: AL-TAB'AH AL-DUWALIYAH in Arabic 26 Nov 84 p 3

/Text/ The nuclear age, which the people of 32 countries have been experiencing for more than 20 years without one casualty because of atomic activity or one person dead because of an atomic accident, is the age Egypt is ushering in with wideopen doors. The number of qualified Egyptian scientists available at the atomic sites permits Egypt to be confident of continuing the march of nuclear technology after it is brought in to our country.

In nuclear reactors in the United States, Britain, West Germany, and Canada Egyptian scientists have been working for years, and still are. Some of them have indeed come to Cairo and the Ministry of Electricity and Energy consulted with them on the atomic reactor projects and on the Egyptian nuclear program to generate electricity from the atom.

Egypt's entry into the nuclear age will open the door to crossing the extensive front of advanced technology so that new blood will be injected into the arteries of the industries of engineering, mechanics, electronics, minerology, designing, and fabrication.

Egypt's choice to make nuclear energy one of its energy sources is an intelligent choice that provides for diversifying our energy sources, the high dam and its plunging water, petroleum, and gas will not be the only sources.

After the safety and security of nuclear reactors has been assured, as well as their economy, after 533 reactors in the world have become active or on the verge of becoming active, and after 10 developing countries entered the nuclear energy field ahead of us, in addition to 22 large and small industrialized countries, the Egyptian decision became an historic responsibility. But after it became clear that Israel has two energy reactors with a third on the way, which is being negotiated for. Egypt's responsibility as scientific, cultural, and industrial leader in this part of the Arab world and Africa is compounded.

Egypt is not more lacking in expertise or ability, nor more in need of nuclear energy than Yugoslavia, Bulgaria, Holland, Poland, Spain, and Romania, nor is Egypt less in rank, size, or importance than Switzerland, Mexico, Pakistan, Argentina, Brazil, Finland, or South Korea.

India Built its Reactors Alone

India has served as a lesson to us and to all developing countries She now owns four nuclear reactors for producing electricity. She started with reactors from America and changed to reactors from Canada, with Indian participation. And now India has completed--by her own efforts, with her local capabilities, and with her national industries--her fourth nuclear station and is now producing atomic fuel in its first stages. Electricity generated from nuclear energy has represented 3 percent of the total energy consumed, but is on the way to becoming 10 percent.

And India is well on her way to implementing her atomic energy program, which targets completing 22 nuclear stations for generating electricity, on which she will spend $13 billion because she believes that it is impossible for India, with her hundreds of millions of people, to advance without nuclear energy.

There is another lesson for us, from Switzerland, the small, neutral, neat, fine-as-the-watches-it-produces country. This country, which is very solicitous of the well-being of its citizens and the cleanness of its land, air, and water, chose nuclear energy in 1957 and built the first nuclear reactor, which is still producing radioactive isotopes for medicine, agriculture, and research. It has five reactors working to produce electricity and has three reactors still under construction. In 1969 one of the reactors was shut down. During this whole period, up to now, not one death has been caused. Therefore they are continuing with the nuclear program and with establishing more reactors because electricity is the pillar of industry, and they do not want further air pollution from thermal stations that burn oil and coal.

Concerning the United States, which has stirred up storms because of a mere incident that did not lead to any deaths, it now has 83 atomic reactors producing electricity securely and safely, with 50 reactors in the process of being completed. Everything that has happened in the United States results from the economic down-turn and a reduction in consumption of electricity by 2.2 percent instead of an increase. This is the first time since World War II that the United States has experienced a reduction in consumption of electricity. So the United States went over its books, reassessed the energy situation, and cancelled construction of 39 thermal electricity stations and 100 nuclear electricity stations that had been planned for by the year 2000. This clearly means that the cancellation of the nuclear reactors is not just because of safety, as some claim!

America is the very country whose president, Reagan, stated that "nuclear energy is one of the most important, vast sources for obtaining more electricity for years to come."

The United States is the country whose government spent $13 billion to develop nuclear reactors, improve them, and insure their safety. This is aside from $150 billion spent in the electrical industry in various ways on research, studies, and tests of the nuclear industry, so that nuclear electricity represents 13 percent of all consumption in the United States, and after completion of the reactors now being built the ratio will become 20 percent.

The American government has recently published studies on nuclear energy which asserted that the American economy grew between 13 and 75 billion /As published/ dollars between 1974 and 1982 because nuclear energy was used to generate electricity, and if it had not been for nuclear energy the economy would have lost this amount. Its value depends on the type of fuel that would have been used if nuclear energy had not been used, especially with the fluctuations in prices.

Those who talk about pollution from nuclear radiation do not know that all the atomic reactors in the world are situated on rivers that provide drinking water, and that they are among farms, dwellings, children, and animals. The British secretary of state for energy announced, and the Ministry of Agriculture, Fisheries and Food confirmed, that there has been no pollution or harmful leaking from British reactors, which number 33 and are spread out all over the country, and some have been in operation since 1956. The minister stated that there has been no effect at all on fish or domestic animals from the nuclear reactors.

To those who raise doubts about Egypt's having the specialized scientific capabilities in the nuclear reactor field, we submit only a sampling of Egyptian scientists who have been working for years at nuclear stations in Britain, the United States, and Canada, and still are. They offered their services to their homeland, Egypt, and some of them actually came to take part, with advice and experience, in studying Egypt's nuclear plan and the current projects, and to take part in assessing the proposals put forth.

Some of these Egyptian scientists are:

(1) Dr Muhammad Muhammad al-Wakil, professor of nuclear engineering at the University of Wisconsin and head of the electrical department there. He is a world authority on nuclear stations and heads the society of Egyptian American scientists in the United States. He came to Egypt several times and is the author of a number of scientific reference works in the nuclear energy field.

(2) Dr 'Isam Muhammad Mukhtar Mutawalli, one of the experts in the United States on energy.

(3) Dr Mamduh al-Shanwani, a British expert on nuclear safety.

(4) Engineer Nabil al-Saruji, in the United States. One of the world experts on nuclear safety equipment.

(5) Dr Fakri Kamil Jaras, one of the experts in Britain on concrete installations of nuclear reactors.

(6) Dr Muhammad 'Ali Zuhdi, in the United States. His specialty is in planning and energy plan calculations.

(7) Dr Salah Husnayn, in Canada. His specialty is safety regulations at nuclear stations.

(8) Dr Sayid Darwish, in West Germany. His specialty is reinforced concrete, before pouring and before finishing, for nuclear power stations.

(9) Dr Muhammad Samir Yasin, in the United States. His specialty is design and development of systems for generating energy from steam in nuclear energy stations.

(10) Dr Farid al-'Ashwawi, in the United States. His specialty is assessing and putting into operation nuclear power stations.

(11) Dr Mamduh Shukri Mahmud, in Canada. His specialty is reactor engineering and safety factors.

(12) Dr Talal Wasil, in the United States. His specialty is safety procedures in nuclear reactors.

(13) Dr Fahmi Mahmud Husayn, in Canada. His specialty is reactor design and safety.

(14) Dr Muhammad Shafiq al-Khabak, in the United States. His specialty is security measures in nuclear stations.

And there are others who have expertise and are still abroad, and there are hundreds of other senior Egyptian nuclear scientists who are now in Egypt, but for long years were abroad.

And even Japan, the only country in the world to be burned with the fire of atomic bombs, the physical and mental effects of which are still present after explosion of the bombs of Hiroshima and Nagasaki, this same Japan, has faced reality, realized the truth, and recognized the benefit of atomic energy and nuclear reactors for building up her industry and recovering from slips and stumbles. This same Japan has rushed to build nuclear reactors for generating electricity after study and research and after making sure of their safety.

Japan has 20 nuclear reactors spread all over the country, and there are 17 more under construction. She has a long-range program for nuclear reactors to produce 30 percent of all electricity consumed. It is now at 18 percent.

For those who talk without knowing, science and scientists say that the normal air that we breathe throughout our lives, in any location, has a percentage of radiation, as does the land, the mountains, and the water as well as television and electric lamps. All of them give off radiation, but all of this is accepted and not harmful. A normal person is exposed to an estimated 100 milirads (the measure of radiation) per year. Residents in masonry homes are subjected to 10 more milirads per year than reisdents of wood homes. Subjecting the body to xrays and medical treatment exposes the body to 100 milirads, and phosphorescent watches and television exposes a person to 5 millirads, while workers in atomic plants are not exposed to more than one millirad in following the safety procedures, which are more numerous in the atomic industries and fields than in any other industry in the world. For this reason no one, over dozens of years and in hundreds of nuclear reactors, has been killed, nor has there been an explosion in a single nuclear station. While in the world there are 4,000 reservoirs and dams, and of those, one collapses every 10 years, on the average.

Well-known nuclear medical expert Dr Tobiyana says, "The danger from any nuclear station leaking radiation is less than the harm from the effects of addiction to smoking one cigarette /daily/ for a period of 3 years."

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INDIA

COMMENTATOR SAYS U. S. SUPPORTS PAKISTAN NUCLEAR PROGRAM

New Delhi PATRIOT in English 23 Nov 84 p 4

[Article by M K Sridharan]

[Text] Since the presence of Soviet troops in Afghanistan is a deterrent, and even General Zia will think twice before embarking on an adventure on this front, the real threat is to India, and the country has no option but to be ready to deal effectively with any mischief from across the border.

The existence of "a strong security relationship" between Pakistan and the United States has been fully exposed in the discussion in the US Senate on what has now come to be known as the Cranston amendment. The discussions also reveal the real objectives of this tie-up which has become a source of menace for all the countries of South Asia.

The congressional records of the debate in the Senate held on 3 October this year provide ample proof that the US Administration is deliberately turning a blind eye to Pakistani attempts to acquire nuclear weapon capability. In fact, it is encouraging Islamabad to develop nuclear weapons capability which is aimed against India, Afghanistan and the Soviet Union.

The discussion in the Senate on an amendment to the Foreign Assistance Act 1961 sought to lay down certain nuclear non-proliferation conditions on American assistance to Pakistan. The amendment did not fully conform to the US Administration's declared policy on nuclear non-proliferation. But, as Senator Cranston said in his speech, "It represented an important compromise effort by Senators on both sides of the aisle to reduce our concern about the direction of Pakistani nuclear programme".

The amendment would have had the effect of "suspending future military assistance to Pakistan if 90 days after the enactment Pakistan engages in a programme to develop or construct a nuclear bomb, acquire technology for a nuclear bomb, or produce plutonium or the highly enriched uranium". In fact, the amendment did not bar US economic assistance and it permitted presidential waiver on a military aid suspension if the President certified that "such termination would irrevocably harm the urgent national security interests of the United States".

As Mr Cranston underlined, the amendment aimed at "tightening conditions in the current law which bar aid only if Pakistan is found to possess or test a nuclear explosive device". But even such a moderate amendment was stoutly opposed by the US Administration despite Senator Cranston's plea that the efforts made by "the four administrations to stop Pakistan's nuclear bomb development programme are simply not working".

"Pakistan is on the brink of producing nuclear weapons. The Pakistanis have developed virtually all the capabilities necessary to produce them," Mr Cranston said.

He pointed out that US policy of "providing extensive military and economic aid to Pakistanis, has resulted only in an indirect subsidy by the US taxpayers of the Pakistani dictatorship's nuclear bomb-building programme". Mr Cranston ridiculed those who made much of the fact that Pakistan has not yet tested a weapon. "They may not need to test — given the extensive design assistance they have received, according to press reports, from other nations". Pakistan, he said, was virtually sitting on the brink of testing.

Mr Cranston recalled that on 9 December 1982, President Zia told the Foreign Policy Association in New York: "I would like to state once again, and with all the emphasis at my command that our ongoing nuclear programme has an exclusively peaceful dimension and that Pakistan has neither the means nor indeed any desire to manufacture a nuclear device."

"Unfortunately, it appears that the government of Pakistan is not keeping its word," Mr Cranston added.

He said it was not possible to go into details in an open session but the following facts were already in public domain:

(1) Pakistan has developed the capability to enrich significant quantity of uranium;

(2) Pakistan has completed work on a pilot reprocessing plant, and is completing civil engineering work on a much larger plant;

(3) There have been chronic failures in monitoring cameras at pakistan's Kanupp reactor, a likely source of spent nuclear fuel for plutonium;

(4) Pakistani nationals have been convicted in courts in United States, Canada, Holland and elsewhere for violating export laws to smuggle key components for nuclear bombs to Pakistan;

(5) Just this summer, Pakistani nationals were caught in Houston trying to smuggle krytrons to Pakistan — high-speed electrical switches whose only use in Pakistani context is for nuclear warhead triggers.

He pointed out: "US military sales programme for Pakistan includes the F-16 aircraft, the world's most capable penetrating fighter-bomber. This aircraft could play the key role in a Pakistani nuclear strike force."

The Cranston amendment evoked strong opposition from the Administration and the discussion on the subject made it clear that the US-Pakistan security relationship is directed against India, Afghanistan and the Soviet Union.

The speech delivered by Senator McClure from Idaho, in defence of the US Administration's position, is revealing indeed. He made it clear that the amendment would have the effect of "terminating the entire security relationship we have so painstakingly worked out over the past three years".

Mr McClure's remarks fully exposed that the so-called Afghan insurgency is a creation of US-Pakistan complicity. He said: "The Afghan resistance is based in Pakistan; the support structure that keep the resistance alive and successful is in Pakistan. All we do for the resistance is and must be done with Pakistan's active assistance."

Mr McClure mounted a slander campaign against India, revealing US administration's real intention in the subcontinent. It was clear that the Reagan Administration was deliberately encouraging Islamabad's military regime in its war preparations against India and was determined to turn a blind eye towards its nuclear weapons programme. He alleged: "Recent sabre-rattling by India and new border incidents, coupled with the mobilisation of the Indian Army in the Punjab, can only serve to remind Pakistan of its dangers." The Administration spokesman said: "This potential vise-like pressure from Pakistan's two largest neighbours confronts Pakistan with a clear and present security danger."

"The Cranston amendment, if passed, would simply lead to a disaster for American interest in the region," he said. It would throw away a valuable security and political relationship with Pakistan.

US Secretary of State George Shultz also conducted a powerful campaign against the Cranston amendment. In a letter to Senator Baker, Mr Shultz said: "It undercuts the trust between our two countries so essential to convincing the Pakistanis that our security assistance is both a commitment on which they can rely and a basis for considering non-nuclear defence options."

The Senator from Louisiana, Mr Johnston, also reflected the US Administration's thinking when he said: "Pakistan is sandwiched between India — their implacable enemy, their historic enemy, who has then greatly outnumbered and outgunned and is quite hostile to Pakistan — and Afghanistan and the Soviet Union."

The debate is a clear proof, if proof were needed, that General Zia has agreed to act as US Administration's surrogate in South Asia, that Islamabad's nuclear weapon programme has the full backing of US Administration, and that the massive build-up of Islamabad's military machine by the US Administration poses a grave threat to Pakistan's neighbours, both India and Afghanistan.

Since the presence of Soviet troops in Afghanistan is a deterrent, and even General Zia will think twice before embarking on an adventure on that front, the real threat is to India, and the country has no option but to be ready to deal effectively with any mischief from across the border.

CSO: 5150/0013

INDIA

OFFICIAL SEES 'BIG LEAP' IN NUCLEAR POWER GENERATION

Delhi Domestic Service in English 8 Jan 85

[Text]

[Text] The chairman of the Atomic Energy Commission, Dr Raja Ramanna, has said that the country is poised for a big leap in nuclear power generation. The program for generating 10,000 megawatts of energy by the year 2000 is on the anvil. Speaking at Pune today, he said that realization of this program would go a long way in meeting the increasing energy demand of the country, for which the nuclear energy is the only viable and economic alternative.

Dr Raja Ramanna also said that in the field of plutonium fuel fabrication, the scientists at the Bhabha Atomic Research Center have already demonstrated the capability by fabricating the first fuel charge for the fast breeder test reactor at Kalpakkam, which is ready for criticality. He said the design work of the prototype fast breeder reactor has already started, and it is planned to be commissioned in the late nineties.

Dr Ramanna was inaugurating an international symposium to commemorate 50 years of the discovery of artificial radioactivity. About 250 scientists, including 40 from abroad, are taking part in the 5-day symposium, which has been jointly organized by the Department of Atomic Energy and the University of Pune.

CSO: 5100/4720

INDIA

BRIEFS

BARC 'TECHNOLOGY CORNER'--Bombay, Nov. 19. Dr. P. K. Iyengar, Director, Bhabna Atomic Research Centre (BARC), told pressmen here that BARC had opened a 'technology corner' and a technology transfer cell for industrialists to avail themselves of the expertise developed at the Centre. He said BARC would provide technical assistance and other data to entrepreneurs interested in its processes. Dr. Iyengar said that a delegation from the Instrumentation Manufacturers' Association visited the 'technology corner' and some members of the association showed keen interest in utilising its technology for developing some instruments. He said the technology transfer cell would act as liaison by providing papers, expertise and blueprints to enable entrepreneurs get land and financial assistance.--Our Special Correspondent. [Text] [Madras THE HINDU in English 20 Nov 84 p 10]

POWER PLANT USES INDIGENOUS TECHNOLOGY--The Kakrapar nuclear power plant in Surat district of Gujarat will have greater use of indigenous technology and know-how. Being built on the bank of the river Tapti at a cost of 382 crore rupees, it will be the country's fifth atomic power project. Modeled on the design of the Narora atomic power plant in Uttar Pradesh, the Kakrapar plant will comprise, among other installations, two reactors each of 235 megawatts capacity, a water treatment plant, and two sets of cooling towers. [Text] [Delhi Domestic Service in English 0830 GMT 4 Jan 85]

CSO: 5100/4718

PAKISTAN

ASSURANCE ON 'PEACEFUL NUCLEAR PROGRAM' VOICED

Karachi MASHRIQ in Urdu 2 Jan 85 p 3

[Editorial: "Pakistan's Peaceful Nuclear Program"]

[Text]

[Text] President General Muhammad Ziaul Haq has once again said that Pakistan's nuclear program is an entirely peaceful program. Gen Muhammad Ziaul Haq made this statement in his address as chairman to the 17th annual meeting of the Atomic Energy Council. This meeting was held to report on the annual output of the council. The good news given at the council was that it has succeeded in producing electricity from nuclear energy, has stepped up the search for minerals, has discovered high-grade seed strains, and provided better facilities for treatment in medical centers using nuclear energy.

Pakistan is not a novice in the field of peaceful nuclear energy experimentation. These experiments have been conducted for years in the fields of medicine, health care, and agriculture. The Karachi nuclear electric power station has been in operation for several years now, although on a limited scale. Nuclear energy also has been used in agriculture, and new strains of cotton plants have been successfully grown. Pakistan has recently experimented in the field of enriching uranium, and this has saved us huge expenditures in the import of necessary material for this purpose. Pakistan's successes in the peaceful use of nuclear power have created displeasure in some countries, among certain hostile elements, and in the anti-Pakistan lobby. They accuse us of intending to use nuclear energy for military purposes and that we are engaged in manufacturing nuclear weapons. On the bases of these accusations, the United States had until recently discontinued economic aid to Pakistan.

Some elements had gone so far as to threaten to attack our nuclear installations. Pakistan has constantly issued assurances that its nuclear program is totally peaceful and that it is only meant to meet its growing energy needs. Nevertheless, hostile propaganda continues against Pakistan. The president has reiterated again his previous assurances. Let us hope that this latest assurance neutralizes the effects of this baseless and mean propaganda.

CSO: 5100/4719

SOUTH AFRICA

NUCLEAR POWER GROWTH REPORTED

Johannesburg ENERGY AND THE ENVIRONMENT in English Oct/Nov 84 p 26

[Text]

The impression created by recent reports that the international share of nuclear energy in the generation of electricity was stagnant, is repudiated by authoritative statistics from the international nuclear industry, says **Dr Wynand de Villiers,** Executive Chairman of the Atomic Energy Corporation of South Africa. The latest statistics in fact point to a growth in nuclear generating capacity in the next few years.

According to authoritative sources 306 reactors were licensed at the end of 1983 for production purposes in nuclear power stations. Of these 293 were operational and since the beginning of 1984 several more came into operation, one of them the first Koeberg reactor in South Africa. The generating capacity of nuclear power stations increased by 8,6% in 1983 and 24 reactors reached production stage.

Dr De Villiers points out that the growth in the international nuclear industry was best illustrated by the fact that 220 new reactors were under construction at the end of 1983. These reactors should become operational in the next 10 to 12 years.

At the end of 1983 nuclear energy was being utilized in 25 countries to generate electricity. Six more countries were in the process of constructing their first reactors and some 20 more were considering nuclear power as part of their energy programmes, many of them underdeveloped countries. Nine countries were planning the construction of 23 reactors, Egypt leading with 8 and Communist China with 5.

Dr De Villiers says that status of the nuclear power industry in the United States was usually quoted as typical of the stagnation in the industry. While it was a fact that the projected growth of ten or more years ago in nuclear power had not been achieved, this could be attributed to many factors. The most important were the tightening up of licensing procedures and safety requirements, leading to increased construction costs and resulting delays. Simultaneously the oil crisis resulted in successful energy conservation programmes and the world-wide economic recession in a lower electricity demand.

However, the USA presents a completely different picture now. In 1983 the contribution of nuclear energy to electricity production showed an increase of 9,5%. A total of 86 reactors were licensed, of which 80 were in operation to contribute a record share to electricity generation in the USA. Another 46 reactors are approaching completion, of which 29 are more than 80% complete and 18 of these more than 90%.

"Of these 18 reactors 7 have already been granted licences to load fuel and run operational tests and they should become fully operational this year. The remaining 11 could be in operation before the end of 1985 and should the USA authorities be able to overcome their licensing backlog, many more units can become operational much sooner," Dr De Villiers says.

In France the share of nuclear energy in the provision of electricity increased by 33% in 1983 and nuclear power stations now provide 48% of the country's electricity. The contribution from fossil fuel power stations — mainly oil — dropped from 64,8% in 1973 to 26,8% in 1983. France has 36 reactors in production and 27 more under construction.

In Japan 25 reactors are producing electricity at present and two more can come on line any day. Another reactor will come into production in February 1985 and six others have reached such stages of construction that they will become operational between 1989 and 1992. Japan is planning to derive 28% of its electricity from nuclear sources by 1990.

Other countries with ambitious nuclear power programmes are Canada where 14 reactors are in production and 11 under construction, Czechoslovakia with 2 and 6, Eastern Germany with 5 and 8, Western Germany with 15 and 12, India with 4 and 5, South Korea with 3 and 6, Spain with 4 and 10, the United Kingdom with 32 and 10 and Russia with 40 and 31.

"South Africa is in no way out of step having entered the nuclear power era, especially in view of the availability of uranium as energy source and the value of fossil coal for the provision of liquid fuels and other products," says Dr De Villiers.

CSO: 5100/11

SOUTH AFRICA

PLAN TO CORNER NUCLEAR WASTE DISPOSAL INDUSTRY

Johannesburg ENGINEERING WEEK in English 5 Dec 84 pp 1, 2

[Article by Matthew White]

[Text]

South Africa stands at the threshold of an important new industry — nuclear waste management — that could earn the country billions in foreign exchange and contribute significantly to raising living standards among the rising population.

South African scientists and engineers are at the leading edge of this new technology, and they will soon be demonstrating their expertise to other experts from around the world.

As with mining, local developments in handling nuclear waste are highly advanced. Unfortunately, South African achievements are so often overpraised in this ego-bruised sub-continent, that the significance of this contribution is in danger of being under-estimated.

International recognition is considerable, however, as is evidenced by the delegate list to the Conference on Radioactive Waste Management, which is to be held in Cape Town during 8-12 September 1986. Already more than 250 scientists from some 25 countries have indicated their interest in attending.

These very important visitors will tour Koeberg nuclear power station and will follow the 600 km route taken by its wastes through Namaqualand (pray that the flowers are blooming at the time) onto the arid fastness of the Bushmanland plateau. There, in the nature conservation reserve that has been newly proclaimed, they may pass by the cold-blooded lizard sentinels soaking up the sun's energy as they have for aeons past and rejoice in the grace and beauty of the hardy, warm-blooded Klipspringer, which are now protected, where their kind elsewhere has been hunted to extinction. The visitors will also see the economic dynamo that has made the proclamation of this nature reserve possible. It is the Vaalputs Radioactive Waste Disposal Site, which was selected only after one of the most thorough investigations ever undertaken anywhere.

The Khoisan, as the Bushmen are more correctly called, no longer inhabit the Bushmanland plateau of the northern Cape Province. It is not easy for humankind to exist in this dry, arid, dust-poor semi-desert and they migrated long ago to more hospitable climes.

Paradoxically, the very incapacity of this land to support human life and endeavour — average population density is one person per 40 km² — has invested it with the potential for this new industry.

Vaalputs means grey well; it is aptly named for there is no surface water and the groundwater is brackish. You would not want to drink it.

The 10 000 ha Vaalputs estate comprises three former "farms", actually seasonal pasture for the sheep of the trek-boers who, in the wake of the hunter-gatherer Khoisan, criss-crossed the transitional zone between the winter and summer rainfall regions, overgrazing the semi-desert even though there was only one sheep to 9,5 ha. Earnings from sheep-farming have declined to negligibility with the past seven years of drought.

Mean annual rainfall is 74 mm; mean annual evaporation rate, at

2 100 mm, is more than 28 times greater. This is one of the most important considerations as water, the universal solvent, has the potential for corroding containers and leaching the dangerous contents.

Groundwater replenishment is slow — the aquifers are anything from 9 000 to 14 700 years old — so the transmission of radiation to vegetation and animals, and hence to humans, is remote in the extreme.

In any case, the clay soil in which the wastes are to buried has ion-exchange properties that would minimise the danger even in the unlikely event of such leaching. There has been no significant seismic activity in this area in the past 35-million years.

Geological studies show that mineral deposits within a 25 km radius of the disposal site are of no economic value — the long-held dream of diamonds has been scotched by De Beers, which tested and found none.

In short, detailed agricultural, ecological, hydrological, minerological, sociological, population and seismic surveys have determined that this site is ideal for its chosen purpose. It is a "Rolls Royce of a site," to quote Dr J P Hugo, managing director of the Nuclear Development Corporation, Nucor.

Dr Hugo and his colleagues have doubts about the potential for the growth of the South African nuclear waste management industry. These doubts are neither technical nor economic, but stem from the force of the opposition to almost all things nuclear that has developed in South Africa during the building of Koeberg.

Indeed, the most formidable barrier to South Africa's entering this growth industry is ignorance. Not ignorance of how to handle such dangerous material, but the ignorance of the highly vocal opponents of the nuclear industry who see only a potential for catastrophe and are blind to the technological advances which can ensure that catastrophe is averted.

In common with other superstitious zealots who have held back progress throughout history, the "anti-nukes" attempt to cloak their prejudices in garments of utmost respectability. With often religious fervour they invoke the latter-day sanctities of ecology and environmental preservation.

The truth is, however, that nuclear power is cleaner than fossil-fuel power and kinder to the environment. Its wastes can be managed more safely and their threat to human existence has been hugely exaggerated.

Had the Pyramids of Egypt been built as storage vaults for low- and intermediate-level radioactive wastes — the type Vaalputs is licensed to handle — these would have decayed to harmlessness millennia ago, they are harmful only for 300 years.

Today the technology is available to engineer disposal sites that will last far longer than the Pyramids and will hold the dangerous wastes safe until they are no longer harmful.

Vaalputs is not yet licensed to handle high-level radioactive wastes nor the highly radioactive spent fuel, which needs to be stored until its valuable elements are either reprocessed or finally disposed of and allowed to decay to harmlessness. That decision is economic, not technical, it depends on the relative costs of reprocessing at the time when reprocessing is desired. The likelihood is, however, that the spent fuel will be reprocessed.

None of the scare stories that I have seen claiming that South Africa may be turned into a nuclear dustbin have even attempted to place the problems of high-level waste into perspective. Simply, the reprocessing of spent fuel from a 2 000 MW nuclear power station (such as Koeberg) gives rise to about 30 m³ — about 30 tea chests — of liquid wastes a year.

Put another way, the amount of high-level wastes that would accumulate from the generation of all the electricity needed by one average person over his or her lifetime would fill a standard wineglass.

By comparison, the same quantity of electricity generated by a coal-fired power station would produce more than 5 000 tons of ash — sufficient to cover a rugby field to a depth of one metre — and would release thousands of tons of noxious gases to pollute the environment.

Nucor and Escom are jointly undertaking an in-depth study of the suitability of Vaalputs for the interim storage of used nuclear fuel from Koeberg.

If, as expected, the study indicates that this type of storage is feasible and desirable, construction of the storage facility could begin in 1986, with the first casks of spent fuel being accepted on site by 1988/9.

Key decisions on this issue are expected to be taken at a meeting on 31 January 1985 of all those involved.

Undoubtedly, some of the delegates to the Conference on Radioactive Waste Management will take the opportunity to lobby South Africa to expand its safe disposal facilities to accept waste from its densely-populated partner countries.

South Africans need to consider very carefully the economic and sociological implications of the opportunities present for advantageous exploitation of a natural resource that has no other known practical utility.

The French, Japanese and Taiwanese, who all have huge nuclear industries and high population densities, are good economic partners. It is in our best interests to strengthen trade ties with such nations.

The South African Government is already on record as being open to the establishment of a spent fuel reprocessing plant, subject to its being a multinational facility operating within internationally accepted safeguards.

There are sound technical, political and sociological reasons why South Africa should take in other nations' nuclear problems. This country's knowledge of dangerous waste disposal is a national resource that could — with the proper investigations and safeguards — be turned into a highly profitable and safe industry.

It will be necessary to educate the public to the issues, but these are not so complex that they cannot be properly understood by ordinary citizens.

South Africa could contribute much to the achievement of a safer, cleaner future by [illegible]

CSO: 5100/12

ITALY

NATIONAL NUCLEAR ENERGY REPORT FOR 1983

Report Details

Rome NOTIZIARIO DELL'ENEA in Italian Aug-Sep 84 pp 34-49

[Excerpts] Location of Plants

During the 2 years since approval of the National Energy Plan, the obstacles and the difficulties in location of nuclear plants in Italy have been partially removed, though there are still problems to be solved. A basic contribution to this was made by the going into effect in January 1983 of law No 8 that introduced modifications in the authorizing procedure for locating plants, assigning to the Interdepartmental Committee for Economic Planning (CIPE), in the absence of agreement by the local authorities, the responsibility and authority to make decisions on identifying areas for installation.

The law also provides for allocation to the regions and communities in whose area are installed, or will be installed, plants not fueled by oil, subsidies to be devoted to promotion of investments aimed at energy saving and recovery, for the ecological-environmental protection of the areas involved in location of plants, as well as social-economic adjustment of the areas.

The provision was applied for the first time in CIPE's decision of February 1983 identifying areas in the Piemonte, Lombardia and Puglia regions for conducting checks and technical suitability studies.

Following successive orders by the Ministry of Industry, technical studies are currently underway in Piemonte and Lombardia, while in Puglia there remain problems regarding the starting time of the studies because of opposition that has developed in the area concerned.

The ENEA [National Committee for Research and Development of Nuclear and Alternative Energy] and ENEL [National Committee for Electric Power] have continued measures to provide assistance and advice to the regions and local administrations. The two bodies have also formed together with many regions joint committees that have agreed to establish a permanent relationship of cooperation and information on energy problems and problems in the integrated development of the country.

The national system structure that has the task of carrying out, according to the unified plan, the construction program of nuclear plants of the water

pressure (PWR) [Pressurized Water Reactor] type envisages the following breakdown of tasks:

ENEL--General architect for location and overall coordination of the activities to establish new nuclear plants, as well as being the sole operator of the plants;

Ansaldo--Nuclear system developer; engineering architect and supplier of nuclear system;

Manufacturing industries--Planning, construction and installation of the subsystem components of the nuclear plants;

ENEA-DISP [ENEA-Safety and Health Administration]--Oversight of all phases of the construction, from planning to final tests, prior to granting the operating license, and checking throughout the operation for security purposes;

ENEA--Industrial promotion in support of development and capability of the national industry for production of safe and competitive systems and components, also on the international level.

This arrangement is the result of an evolution and rationalization of the system that has been underway in the conventional plant sector.

On the manufacturing industry level, rationalization of the system has been completed for the more specifically nuclear aspect.

In regard to the nuclear steam generator, the various specific contributions are broken down as follows:

FIAT-TTG: Internal components of the vessel, primary pumps, auxiliary pumps, control rod mechanisms, fuel distribution systems, valves;

Ansaldo DDCV: Vessel, pressurizer, steam generators, containment and support structures;

Belleli: Tubing of the primary circuit and assemblies, heat exchangers of the auxiliary circuits;

FIAT-Gilardini: Constraints and supports.

For the core of the reactor:

AGIP and Fabricazioni Nucleari: planning and supply of refuels, production of fuel elements;

FIAT-TTG: Mechanical parts of the fuel elements, control rods.

For the instrumentation, a general agreement has been reached among Ansaldo Elettronica, FIAT-SEPA and Nuovo Pignone (ENI) [National Hydrocarbons Agency] to provide the systems for observation and control, the protection system, the

system for radiation monitoring, and the instrumentation of the field and panel.

In regard to the conventional portion of the installation, various agreements have been reached and others are in process among various industries to supply the various subsystems (turbo-generator unit, thermal cycle, instrumentation, ventilation and cooling, and waste treatment) pending the formal commitment by ENEL.

Heavy Water Reactor: Cirene Enterprise

Activity has continued in constructing the experimental Cirene reactor of 40 megawatts electric (MWe) near Latina.

The overall level of completion of the enterprise had reached 65 percent at the end of 1983, compared to 45 percent in December 1982.

As noted, this is a joint initiative of ENEA-ENEL as prime agents, and involves completion of the nuclear island assigned in 1974 to NIRA Corporation [nuclear firm of Genoa] of the Ansaldo group.

The development planning process for this project has been relatively complicated.

Included in the PEN (National Energy Plan up to the end of 1981) as a means toward "better capability for national industry" was financed, in the context of the financing of ENEA's fourth 5-year plan, by law No 85 of March 1982, a law that provides for a study by the CIPE to establish the times, costs, and necessary conditions for completion of the project and getting it into operation.

In August 1982, in accordance with the guidelines set by CIPE, the minister of budget and economic planning assigned the study to a special commission of experts.

A decision on the completion of the enterprise, with indication of the relative target times and costs, was adopted by the CIPE by resolution of 22 February 1983.

The investigation sponsored by CIPE requested the prime agents, ENEA and ENEL, as well as the system developer NIRA, to become involved in the various aspects affecting progress of the plant.

The initiatives that were taken can be summarized as follows:

Organizational aspects--In close agreement between the two prime agents, updating of the decision-making bodies of the enterprise was promoted.

Also, the shares were issued for establishment of the ENEA-ENEL joint corporation, open to the necessary participation by NIRA, for management of the plant.

Financial and Contractual Aspects--The financial participation in the Cirene enterprise by ENEL and ENEA having been established at the agreed shares, based on the previous agreements, ENEA arranged extension of the existing contractual instruments with NIRA to bring them into line with the current requirements.

Importance of Cirene Enterprise

In retrospect of 2 years later, the general framework of the Cirene program has been confirmed and proved sound. In fact, the PEN has progressed into the implementation phase in regard to the authorizing aspects and planning of the PWR plants of the unified program, but not yet for the orders by industry; however, the function of Cirene, intended as an instrument for upgrading the entire production system and tied to later projects, still retains its role and importance.

The most qualified sector of the national manufacturing industry has participated in construction of the components and systems of the plant, not to mention the various aspects of implementation planning, as well as devoting personnel of various training, with time flexibility depending on the specific implementation needs.

It should be noted that the development of the completion plans for the Cirene enterprise has enabled the manufacturing industry to achieve high tecimological standards and some other aspects, including organizational, through systematic application of the quality guarantee criteria; standards which are relevant to a much broader field than simply nuclear plants.

Also noteworthy is the support that the overall experience from the Cirene enterprise has given to the promotional capability of the national system, which during 1983 has been able to participate on a equal basis with other qualified foreign competitors in international bidding on contracts for nuclear plant development.

Fast Neutron Reactors

In 1982 and 1983 activity continued regarding Italian participation in construction of the first power plant equipped with a fast neutron reactor cooled with sodium (SuperPhenix-1).

This plant, located at Creys-Malville (France) near the Rodano river, is now almost completed. The public works part of construction started in December 1976. Production of the components was carried out between 1978 and 1982, and installation was started in May 1980 with placing of the security tank inside the reactor building.

The Italian participation in this development was part of the primary objectives of the Italian program of fast reactor development, a program based on close cooperation with other European countries that have made the same choice.

In Europe in recent years a significant effort has been made to bring the fast process to commercial maturity.

The participation in the SuperPhenix plan and the successive European initiatives, however, is a part of that objective and of acquiring constantly greater technical skills for the national industry.

The Creys-Malville plant is owned by NERSA, a French legal corporation composed of the following European electric power enterprises:

--EDF (French Electric Company) (France) 51 percent; ENEL (Italy) 33 percent; and a joint corporation of RWE (FRG), Electro Nucleaire (Belgium), SEP (Netherlands), and CEGB (United Kingdom) 16 percent.

NERSA's role includes that of general industrial architect for the entire plant. The corporation's structure is based on the organizational model of the EDF, and the ENEL is participating with its own personnel (about 20 engineers assigned to Lyons for the implementation phase).

Various companies, French, Italian and German, have been enlisted by NERSA for the power plant project. For the nuclear island, NERSA awarded a "turnkey" contract to the Italian-French NIRA-Novatome corporation, in which NIRA will have a participation of 33 percent.

These two companies have formed an integrated organization, including French and Italian engineers and technicians, that has played, and will continue to play, the role of "main contractor."

In addition to participation in the project and in the management project of the nuclear island, NIRA has directly assumed the role of prime contractor for all the related Italian contributions.

The equipment and services provided by the Italian companies represent about a third of the total cost of the nuclear furnace.

The Italian participation in SuperPhenix is not limited to the components of the nuclear furnace, but also covers the conventional island, with relatively important contributions.

NIRA also participates in fuel planning, and in this connection a third of the nuclear fuel assemblies were produced by the Italian AGIP company.

In January 1984 an agreement was signed in Paris between the governments of Belgium, France, the FRG, the United Kingdom and Italy on cooperation in the field of development of the European approach of breeder, fast neutron reactors. The agreement sets as a medium-term objective reduction of costs through development of the process, harmonization of the basic security standards, and promoting spread of knowledge in order to achieve a common European reactor program, avoiding duplication of efforts and resources.

The agreement, which constitutes the policy umbrella to promote and facilitate cooperation among the industries of the five countries, envisages two drafting

of other derivate agreements, of which the first, the memorandum of understanding on reactor technology, was signed in March 1984. Beginning in 1981, the research and development activities in the fast reactor sector conducted by ENEA were redirected in the necessary ways to better adapt the Italian situation to the new reality that has developed in the European context.

In particular, the intention is to avoid any form of dispersion of efforts, concentrating activities on sustaining and increasing, with adequate forms of industrial promotion, promotion of the acquired capabilities of Italian industry or those necessary for participation in completing the SuperPhenix and the PEC [Fast Reactor for Fuel Element Testing] reactor.

Under the ENEA-NIRA joint venture agreement drawn up in October 1981 for research and development in support of the fast approach, ENEA has continued activities related to the "system" and the "fuel."

For these activities, ENEA has committed in the context of the fourth 5-year plan (1980-84) about 300 billion lira (including the fuel and excluding the PEC).

PEC Enterprise

Activity has continued toward completing the PEC experimental reactor, a fast reactor cooled with sodium which, as noted, is the main testing facility planned in the Italian program for fast reactors under ENEA. The overall degree of completion at the end of 1983 was 45 percent, compared to just over 30 percent on 31 December 1982.

The PEC enterprise is in the context of the European cooperation on the approach of fast reactors with sodium, and a whole network of agreements has been reached in this regard.

Within this program, the PEC is the principle tool enabling testing of fuel elements under various operating conditions and on a full scale, in a situation which recently lost the support of the French Rapsodie reactor, due to its shutdown.

The completion of the enterprise, whose design was developed by CNEN (now ENEA) beginning in 1965, was awarded to NIRA in 1974 with the role of "architect-engineer" and "prime contractor" for all the work, with the exception of the core and supply of the fuel, and the carrying out of the support test program, which is the responsibility of ENEA.

The process of getting the enterprise underway experienced various difficulties, of both financial and oprganizational nature, which after 1980 were progressively partially resolved.

The enterprise was included in the national energy plan (end of 1981) as a "tool for research and development of fuel for fast reactors, and for experimentation in the security aspects of development of the national industry capabilities." It was financed, in the framework of financing of the

fourth 5-year plan of ENEA, by law No 85 of 1982, which assigned CIPE to prepare a study of the time periods, costs and necessary conditions for completing the enterprise and putting it into operation.

In August of 1982, in accordance with the guidelines issued by the CIPE, the minister for budget and economic planning entrusted the study to a special commission of experts.

A decision on the completion of the enterprise with indication of the relative target times and cost was adopted by the CIPE by resolution of 22 February 1983.

The investigation sponsored by CIPE requested the commissioning agent, as well as the prime contractor NIRA, to take action in the various aspects affecting progress of the plant on the basis of the resolutions of the board of directors of ENEA (No 63 of 1983) and cited in the introduction to that same CIPE resolution.

The initiatives taken can be summarized as follows:

Organizational aspects--Provision for revising the ENEA organization structure responsible for the commissioning.

--Appointment of a sole manager of the enterprise, who is assigned all the related responsibilities, both in completion of the installation and the operation tests and bringing the reactor up to power.

--Provision for organizationally adapting the "Fast Reactor Department" of ENEA to handle the activities assigned to it in connection with the enterprise (planning of the core, support tests, planning of nuclear shields).

Contractual and financial aspects--On 27 April 1983 an amendment to the ENEA-NIRA contract for the PEC enterprise was drawn up granting ENEA majority control of the enterprise and also giving it a more precise commissioning role.

--From the financial aspect, ENEA not having received the supplement of about 240 billion for the fourth 5-year plan, it was necessary to plan a time delay adjustment of the allocations in comparison to the plan in the CIPE resolution.

Importance of PEC Enterprise

In addition to being a tool for upgrading the entire Italian production system and tying in with subsequent projects, the PEC's role in the national and international energy strategy has been further strengthened by the progress in integration on the European level of the agreements on the fast approach development.

Of particular relevance in this respect is the agreement of August 1983 on construction of the Argo group, with participation of the nuclear research bodies and systems industries of Italy, France, Germany, Belgium and the

Netherlands, to jointly determine and assure the concrete conditions for development of the fast plants as a long-term contribution to security of European energy supply, in a framework of cooperation confirmed by the agreement signed in January 1984.

The agreement reached in 1983 between ENEA and the French Atomic Energy Commission (AEC) for joint management of the Cadarache plant for producing fuel elements of mixed uranium and plutonium oxides, and to conduct joint research and development resulting from the production process, is a further concrete step in the direction of international cooperation on the processes of the fuel cycle.

In this context, the PEC's contribution as a facility for testing and bringing up to standard the fuel for fast reactors becomes fully evident on the international level.

On the national level, the completion of the PEC installation makes it possible to maintain and develop the involvement of manufacturing industry. The planning and implementation skills have been increased, mobilizing them and directing them toward a substantial goal of economic importance and technical complexity.

Equally important is the effect that the PEC installation has had on the national system, making possible development of activity in the planning field and in internal and external organization that have enabled, in particular, expanding Italian industry's participatory role in the Italian-French-German SuperPhenix-1 plant, as well as participation in the activities underway on SuperPhenix-2 and the German fast powerplant Snr-2.

Fuel Cycle--Capacity and Industrial Structures

In view of the responsibilites assumed by ENI in national energy supply, and recognizing the necessity for integrated management of the industrial phase of the nuclear fuel cycle, CIPE some time ago entrusted to ENI the task of assuring that the Italian market has the services related to supply of fuel for nuclear-source electricity production.

ENI, on the other hand, has established a coordinated industrial structure under AGIP Nucleare (recently merged into AGIP), which for several years has been involved--directly or indirectly--in all the phases of the nuclear fuel cycle.

Fuel cycle services relating to reactor

The phase of the fuel cycle leading up to loading the reactor, the uranium enrichment operation, is fulfilled by the Italian participation in the Eurodif installation, in which AGIP and ENEA each have an 8.125 percent share participation.

During the last 2 years a series of actions have been completed to reduce the economic burdens that the Italian customers AGIP and ENEL (to which ENEA ceded the rights to draw on the service) would have had to bear if they had drawn all the quantities of enriched uranium provided in the contracts concluded at various times with Eurodif. It is well known that those quantities significantly exceed the modest requirements that have developed in the Italian market because of the failed takeoff of the national nuclear power program planned in the mid-1970's.

The solution recently developed and implemented is based on a complex mechanism that enables the Italian customers to have access to the electric power corresponding to the enrichment services not drawn and to be able to make the withdrawals at a later period. This results in an overall economic risk for the customers significantly lower than would have been the case if the original contracts had been fulfilled or canceled.

Three industrial enterprises in Italy currently produce the fuel. They are under two companies: Combustibili Nucleari and Fabbricazioni Nucleari, both controlled by AGIP. Combustibili Nucleari (50 percent AGIP Nucleare, 50 percent UKAEA) produces about 35 tons per year of natural metallic uranium in "magnox" cans, constituting about 50 percent of its production capacity, for the Latina power plant.

Fabbricazione Nucleari manages two plants, the smaller located at Saluggia, and the larger and more modern at Bosco Marengo. The Saluggia plant will in future work on production of PWR fuel of the Trino type. However, in the near future it is planned for Bosco Marengo plant to concentrate on production of all types of UO_2, as well as production of fuel elements and part of core elements for fast reactors.

Fabbricazioni Nucleari has a General Electric license to produce the fuel elements for BWR reactors, and a Westinghouse Electric Corporation license to produce fuel elements for PWR reactors. Also, it has close licensing agreements with the COGEMA company and the French Atomic Energy Commission to produce fuel materials and other core elements for fast reactors.

The annual production capacity of the Bosco Marengo plant is more than 200 tons.

The basic process plan involves production of fuel elements of the BWR type, for which the plant was originally designed. However, the acquired operating experience, new equipment, and various modifications in the installation have increased the plant's flexibility, so that it can now produce pellets of UO_2, of various specifications, using powders obtained by various wet processes (like the ADU and AUC), and dry processes (like the GECO of General Electric or the ENEL and COGEMA processes). In regard to the phase of rod loading and assembly, it can already meet various product specifications, including those for PWR-type fuel.

The Bosco Marengo plant also has two lines operating for production of core components for fast reactors:

--A line for production of fuel materials and fissionable materials for reactors of the SuperPhenix type, with a production capacity of about 400 elements per year (equal to the demand for fuel materials for two loads of a SuperPhenix reactor);

--A line for producing passive core elements and structural units for the fuel elements of the Italian experimental reactor, the PEC.

The plant's layout and the organization of production enable use of various lines in parallel.

The Bosco Marengo installation is committed to producing the second loading for the Caorso BWR plant, UO_2 pellets for the first and second loadings of SuperPhenix, and passive core elements of the PEC reactor, specifically: the filtering elements, reflecting elements, refilling elements, the shield elements, and the special elements.

Fabbricazione Nucleari will have at its disposal both the technological knowledge ensured by the licenses and the improvements in production techniques that may emerge from the development programs conducted either directly or through the AGIP laboratories. The majority of these programs are developed jointly with the licensing parties, the national system industry, and ENEA, and benefit from the support assured by ENEA through industrial promotion measures.

Services for Down Cycle of Reactor

Along with the undertaking of industrial initiatives for provision of fuel, AGIP has also undertaken, in various ways and time periods, to provide down cycle fuel services for the reactor, scaling its measures in accordance with the real needs that develop in operation of the plants.

This involves developing at the industrial level "ad hoc" processes and technology, hence these activities are carried out in close cooperation with ENEA, operating as an integrated structure.

In the short to medium term, the services that have been assured involve:

--Transport of spent fuel from the plants to the temporary storage site;

--Storage of the radioactive fuel at a centralized installation.

For transport of the radioactive fuel, AGIP has developed, and is currently in the process of turning over to ENEL, a container for transport of the spent reactor fuel from Trino and Garigliano from the plant locations to the temporary storage pit at Saluggia.

AGIP is also planning a centralized storage installation for radioactive fuel, for which there is a predicted demand in the 1990's time-frame.

For the anticipated long-term industrial requirements relating to the phases of the cycle (reprocessing of radioactive fuel, and treatment of high activity

waste produced by the reprocessing installation), AGIP is committed, in close cooperation with ENEA, to agreed use and adaptation for industrial experimentation of ENEA's own pilot plants, today already in operation for reprocessing, and development and management of demonstration plants for solidification of high activity wastes.

This national effort has turned to strengthening the technology necessary for carrying out industrial initiatives at a time when the Italian market will need these services, when the nuclear power plants of the national energy plan go into operation.

Treatment and Management Services for Low and Medium Activity Wastes

In Italy it is the NUCLECO company that functions in this sector.

NUCLECO is a company with participation 60 percent AGIP and 40 percent ENEA, formed in 1981 to ensure treatment and management services for radioactive waste of low and medium activity produced in Italy by the various producers (ENEA research locations, ENEL plants, hospitals, etc.). It is an activity that is not tied in a specific way to the nuclear fuel cycle, but is related to it.

Pending the equipment and preparation of a site where it is planned to provide the treatment service on a centralized level for all the producers, NUCLECO today provides this service with mobile equipment, at the waste production site.

In addition to providing services with its own equipment at national producer locations, NUCLECO manages its own treatment center, put at the disposal of ENEA, at the Casaccia Center, where it carries out decontamination and treatment services on the waste of the center itself.

Research, Development and Industrial Promotion Activities

In the context of general strategic activities in the nuclear fuel cycle sector, ENEA, fulfilling its proper institutional role, has undertaken the activities of research, development and industrial promotion.

On the operational level, these activities have been carried out by ENEA's fuel cycle department, operating through four centers of the organization (Casaccia, Saluggia, Trisaia and Frascati), and in various locations abroad (Tricastin and Cadarache in France, Karlsruhe in Germany, and Mol in Belgium), and in the community (CCR Ispra). During 1983, ENEA's activities have concerned all phases of the nuclear fuel cycle.

Natural Uranium

In the sector of uranium material, ENEA's responsibilities have been limited, because CIPE long ago assigned to ENI all the activities of research, exploration, processing and marketing of uranium-bearing minerals.

ENEA's activity is limited to keeping up to date a basic scientific and knowledge support, in close cooperation with the ENI Group corporations, oprators in the sector, and in the context of the initiatives developed by international organizations such as the EEC and the IAEA.

Uranium Enrichment

In the sector of uranium enrichment, ENEA has engaged in two lines of activity:

--Assuring the necessary followup to the commitments resulting from ENEA's participation in the Eurodif corporation. In this context, ENEA has cooperated in particular with ENEL and ENI in initiatives aimed at reducing the burdens relating to the excess enrichment services in the supply contracts signed in the past with Eurodif;

--Continuing research and development activities in photo-assisted methods of istopic enrichment of uranium, with particular regard to lapsed initiatives including alternative applications (other photochemical processes; development of laser sources adaptable for application in fuel processes, etc.).

Fuel Production

In the sector of production of fuel for thermal reactors, ENEA's activities have developed in the following main areas:

--Continuation of the actions related to supply of the Cirene fuel, through improving the production line installed at the IFEC plant of the Saluggia Energy Research Center and preparation of the contracts for supply of structural and fissionable materials. Also, close cooperation has been established with the national fuel authority in order to use the capabilities and skills, at the same time promoting their transfer to the knowledge necessary for production of fuel for heavy water reactors;

--Development, in support of the national industries, of processes, projects and details relating to experimental plants operating in the field of conversion of raw uranium concentrate into purified oxide and in production of fuel elements for heavy water reactors, and a start to completion of the plants themselves;

--Completion in Iraq of the "site training" of the fuel production laboratory provided to the Iraqi nuclear agency as part of a contract with ENEA and SNIA-Techint.

In the field of production of fuel for fast reactors, the objectives of major importance pursued during 1983 were the following:

--Signing of the agreement between ENEA and CEA on joint implementation of research and development activities and joint management of the Cadarache production plant;

--In cooperation with AGIP, improvement of the sol-gel process for production of U-Pu mixed oxides, as well as initial evaluations of application of the process to production of ceramic dies of potential interest for containing radioactive waste of medium to high activity;

--Obtaining renewal of the operating license for the plutonium installation of the Casaccia Energy Research Center and undertaking of the necessary modifications to adapt that installation for the activities planned for it, particularly in relation to the plan for development of fuel for fast reactors using the PEC.

Fuel Reprocessing

In the field of reprocessing of radioactive fuel, there was particular development of the initiatives, though in a frame of reference that has not yet been completely defined, mainly as a result of the slowdown in development of the PEN and the restructuring of the nuclear activities previously put under AGIP Nucleare. They can be divided according to the following areas:

--In the area of "reprocessing experimentation," the activity continued in carrying out reprocessing series at the Eurex installation of the Saluggia Energy Research Center that are more and more representative of the future industrial goals. On completion of the reprocessing of the Candu fuel from the Canadian Pickering plant, evaluation has begun of the feasibility of Eurex reprocessing of the PWR type fuel unloaded from the Trino plant, and identification of the necessary installation modifications. Simultaneously, research activities have continued at the laboratories of the Casaccia Energy Research Center in developing original and better chemical systems for reprocessing;

--In the area of "components development," in line with the direction taken by ENEA of assigning to the Itrec installation of the Trisaia Energy Research Center the role of "experiment station" for development and heat testing of advanced technology processes and components, some of the initial study activities have been carried out preparatory to heatup of that installation, planned for the second half of 1984.

Treatment and Conditioning of Radioactive Waste

In the field of treatment and conditioning of radioactive waste, the activities are intended to meet two needs: satisfy with the necessary reliability the requirements of the Control Authority on treatment and conditioning of radioactive waste produced in ENTE's plants, and, in meeting these requirements, to make maximum use of the results of ENEA's research in development of better and more economical techniques in that field.

In the field of storage and transport of radioactive fuel and waste several actions have been initiated in testing storage techniques and planning transport containers.

Security and Control

The role of organization responsible for nuclear security and health protection of the workers and the population is, as known, assigned by law to ENEA (formerly CNEN) and is carried out by the Safety and Health Administration (DISP).

DISP was the subject, during the July 1981 to April 1982 period, of a broad reorganization, whose main objective was to develop the most efficient work organization possible to handle the tasks assigned by the PEN. In particular, the approval of that plan and the indication of the go-ahead on the pressurized water plant approach, to be carried out on the basis of a unified plan developed by the power authority and national industry, with constant checking by ENEA, provided DISP with an operating scenario that was quite innovative compared to the previous situation.

The situation in the period 1960 to 1970 was marked by a different kind of industrial reality in which ENEL operated as a purchaser (basically with the so-called "turnkey" contract system with foreign installations), and, on the other hand, the national industry, having developed only to a limited degree the approach of assimilation of licenses, was heavily dependent on the support of foreign suppliers and, in the absence of adequate market dynamism, showed itself more interested in solution of individual problems on a "case by case" basis, rather than in a systematic working out of technical and organizational solutions of a general nature. Under such conditions, the action of the control organization also had objective limits in application.

Likewise, in the field of requirements in the choice of sites, criteria and methodologies were developed that, while deriving from the U.S. ones an overall environmental view foreign to the Italian legislative body, responded to the individual needs of our land and the national orientations.

The specific field of geo-seismology is another field in which the objectives ans security requirements prompted by the Italian reality require adoption of local methodology and operating criteria different from those used in other countries.

In summary, one can say, however, that while adherence to the original guidelines for the entire plant technology area has been a general practice (except with improving changes), the solutions in the field of radiation protection and locality factors have shown a largely independent development. The foregoing, incidentally, has given rise to a control activity in the plant technology field that is oriented to solution of the problems of individual plants (Caorso, Montalto di Castro), which amount to guiding precedents, but which have not been accompanied by issuance of guidance of a general character.

The prospects outlined by the National Energy Plan for completion of a series of plants on the basis of a unified plan has presented to DISP the problem of a change in practice, with greater commitment to independent development of "guidelines" also in the area of plant technology that would give the electricity authority and national industry a sure frame of reference.

To meet this requirement what was needed above all was an upgrading of structure, in order to be in a position to face such a task, among other things in an international situation (particularly in the United States) that, after Three Mile Island, was marked by a significant number of problems of reorientation and a stage of development that made it fluid.

In the meanwhile, the increased sensitivity of the social parties to the problems of guaranteeing security and protection required a greater and more specific capability by DISP to provide a framework of technical and formal established principles in comparison with the past. In this context, there was also recognition of the need to refine the justification process for operational decisions using the more recent analytical methods of probability, even beyond their intrinsic value as instruments of technical investigation. In the same context, there also became evident the increased "demand" for involvement of the control body, thereby overcoming a narrow interpretation of the institutional responsibilities derived from the legislation on nuclear emergency matters, on the related planning and capability for involvement, and civilian protection in general. An example of this problem situation is the Caorso power plant, where the DISP was called on for a significant broadening both of its activity in revision of the emergency plan (with the full involvement of the local organizations and the related tasks in training personnel and developing appropriate structures), as well as in upgrading DISP's technical action facilities for nuclear emergency incidents.

DISP and the Unified Plan

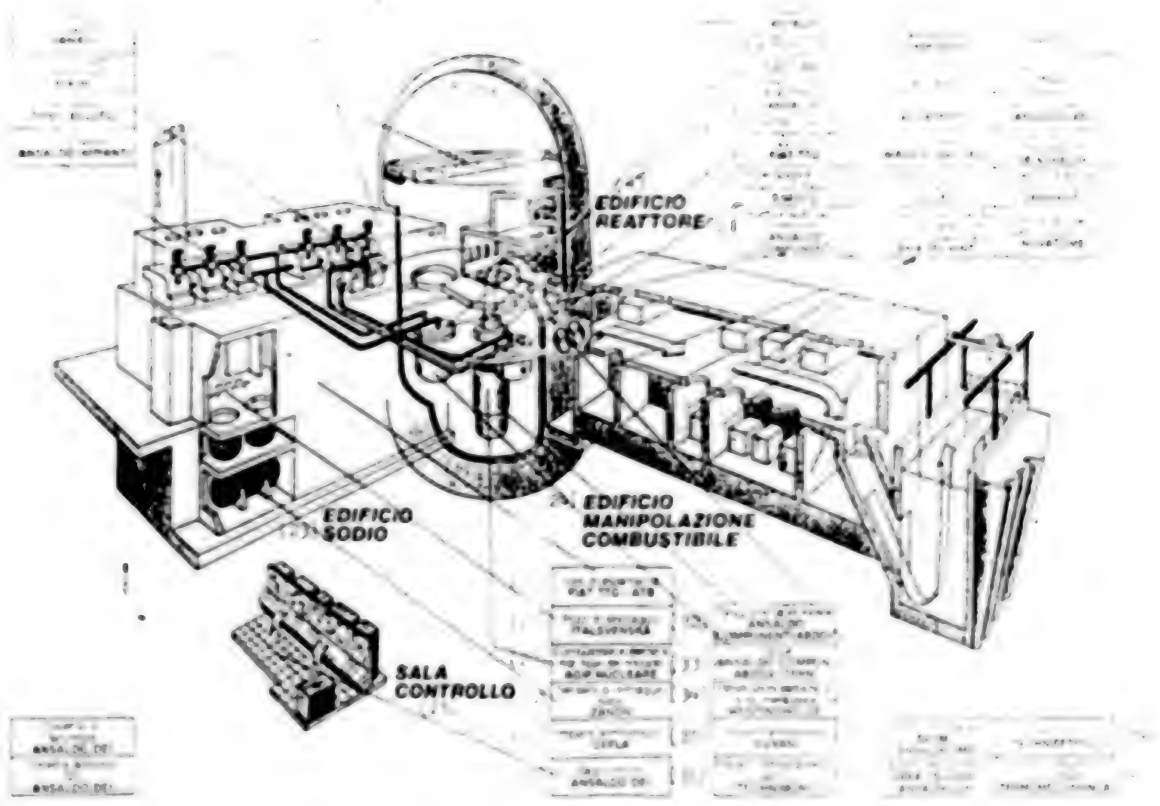
ENEL in July 1982 forwarded to the DISP the details of a design plan citing the Westinghouse 312 model, adapted to the Italian technical and guideline conditions.

DISP, in accordance with the PEN directives, undertook a comparison of the guideline criteria and the solutions adopted by the main European countries using the PWR technology on the level of conceptual planning, intending to continue this comparison in the phases of greater planning detail.

Development of specific criteria for radiation protection and security was also started, to be applied during the later phases of planning and to be checked on the basis of the integrated security analysis provided for by the PEN.

The direction established by the PEN, under which the DISP is to keep track of the process development and interact in the real-time operational decisions, includes development of the technical positions on the various aspects of security and protection, in parallel with the orientations of the planners. This requires the involvement in the related activities of the unified plan of numerous technical units of the DISP on a continuous basis, with close operational and management cooperation.

During 1983 the review of the plan submitted by the ENEL was completed. This had involved extensive detail activity with the electrical authority and industry on the priority aspects of planning (general decisions, overall plant arrangements, radiation protection aspects, etc.). The development of general



— IMPIANTO FBC - FORNITURA DEI PRINCIPALI COMPONENTI

Key on following page

Key

1. Polar crane: Demeli.
2. Primary, inserts, sodium tanks: Fucmi.
3. Coil heaters: Tosi-Belleli.
4. Sodium circulation system: Ansaldo Impianti.
5. Civil engineering: Astaldi.
6. Charge and discharge unit: [illegible]
7. Centrifugal pumps: FIAT TTG-Ansaldo.
8. Unit operating core regulating rods: FIAT TTG.
9. Entrances and metal structure container: SIMOCO.
10. Intermediate reactor exchangers: Ansaldo Componenti.
11. Transit channel: Ansaldo Componenti.
12. Gas purification system: Sulzer.
13. Ventilation: Aerimpianti.
14. Electricity panels: Magrini Galileo.
15. Absolute continuity system: SICE.
16. Liniums and penetration well, and component handling equipment chambers: SNIA Techint.
17. Test channels: FIAT TTG.
18. Anti-sodium-fire unit: DEI.
19. Electrical equipment: Ansaldo ASI.
20. Exchangers, 5.8,) MW: [illegible]
21. Handling, transporting equipment: Zechinati.
22. Vious. electromagnetic pumps: Novatome.
23. Sodium building.
24. Fuel control building.
25. Control room.
26. Expansion vessels: FIAT TTG-ATB.
27. Storage shafts: Italsevensa.
28. Fuel and nonfissionable elements of core: AGIP Nucleare.
29. Sodium drainage tanks: Zanon.
30. Thermohydraulic equipment: CEPLA.
31. Control room: Ansaldo DEI.
32. Tank and internal structures: Ansaldo Componenti/ABDGV.
33. Tank: Ansaldo Componenti/ABDGV/Terni.
34. Electric and instrument entrances: Westinghouse.
35. Anti-incendiary equipment: Silvent.
36. Azole cooling equipment: Technimont.
37. Emergency diesel units: BACM-Ansaldo Imp.
38. Radiation protection system: SEPA-Silena-Ansaldo DEI.
39. FREON equipment: Technipetrol.
40. Waste gas treatment equipment: Termomeccanica.
41. Security system: Ansaldo DEI.
42. Data collection system: Ansaldo DEI.
43. Reactor building.
44. PEC INSTALLATION--SUPPLIER OF MAIN COMPONENTS.

DISTRIBUZIONE GEOGRAFICA DELLE ATTIVITÀ DELL'ENEA
NEL SETTORE DEL CICLO DEL COMBUSTIBILE

Key

1. Geographical distribution of ENEA's activities in the fuel cycle sector.
2. [illegible] Center
   --[illegible] (FBR)
   --Reprocessing (Itrec).
3. CCR Ispra.
   --ENEA activities in development of waste treatment processes.
4. ENEA Trisaia Center
   --Reprocessing (Itrec).
   --Development of waste treatment processes.
5. ENEA Casaccia Center
   --Uranium enrichment.
   --Production of Pu fuel.
   --Reprocessing (process development).
   --Waste treatment (process development).
   --Post-irradiation examinations.
6. ENEA Frascati Center
   --Uranium enrichment.

Locations of ENEA Activities Abroad.

--Tricastin (France): uranium enrichment.
--Cadarache (France): Pu fuel production.
--Mol (Belgium): reprocessing.
--Karlsruhe (FRG): development of Pu fuel production processes.

criteria for security and protection and the applicable reference guidelines were also completed.

Test of Cirene Reactor

Rome NOTIZIARIO DELL'ENEA in Italian Aug-Sep 84 p 90

[Excerpt] The inspection pressure test of the metal security container of the Cirene plant was completed successfully. The plant is being constructed at Latina by Ansaldo on behalf of ENEA and ENEL. As is known, Cirene is a nuclear reactor controlled by heavy water and cooled by light water, with power of 40 megawatts, and of completely Italian design and planning.

The metal container that was test inspected contains the civil engineering elements, the reactor, and the associated circuits. It is a cylindrical structure 28 meters in diameter, 49 meters high, and 32 millimeters in average metal thickness. The structure was designed, in accordance with the nuclear guidelines, by Ansaldo and constructed by Bellelli.

The pressure test inspection, carried out after evacuating the yard, involved pressurization with air up to 2 atmospheres (a much higher pressure than will be reached under the worst conditions of possible incidents) and was intended to check the leak rate and mechanical resistance of the container. The test results met the specifications of the project. The instruments used for the test were particularly advanced and enabled immediate collection and evaluation of the results, thus insuring on a continuing basis security of operation and perfect functioning.

PHOTO CAPTIONS

1. p 90. View of the metal container of the Cirene reactor in February 1984. Its outside height is 42 meters and diameter 28 meters.

2. p 58. View of the SuperPhenix power plant at Creys-Malville (France) in March 1982.

3. p 42. PEC construction site in December 1983.

4. p 45. Pilot fabrication fuel elements for the ENEA Saluggia power plant. View of mechanical presses.

5. p 47. AGIP's activities in the nuclear fuel sector. (Above) Store of uranium [illegible] at Bosco Marengo. (Below) Assembly of a fuel element at the Saluggia installations.

6. p 48. Trisaia center. Glass-melting furnace at Ivet-1 plant for experimentation in processes for enclosing radioactive waste in glassy materials.

9926
CSO: 5100/2321

URANIUM PROSPECTING TO BE HALTED

Stockholm DAGENS NYHETER in Swedish 5 Dec 84 p 6

[Article by Ingemar Lofgren: "Uranium Prospecting Halted: No Longer Profitable"]

[Text] All uranium prospecting in Sweden is to be discontinued except in Ansele in Vasterbotten.

The reason according to SKB [Swedish Nuclear Fuel Management] is that the access to foreign uranium is now so good that Swedish uranium mining has become less important.

It is indeed important to have domestic uranium in reserve, but it has become less important in today's situation," Sten Bjurstrom, SKB president, tells DAGENS NYHETER.

"One reason for this is that the access to uranium has become so good and it is no longer especially expensive.

"We intend therefore to concentrate on deposits at Asele and discontinue the activity at other sites," says Bjurstrom.

The SKB has prospected and mined uranium ore at several locations in Sweden over the years. The prospecting costs have totaled approximately 100 million kronor.

Since 1977, the SKB has been working primarily at Hothagen in the Jamtland district of Krokom, which is the country's largest uranium deposit with around 3,000 metric tons of extractable ore.

Although the SKB has invested some 20 to 30 million kronor for test drillings in the area, it was announced Tuesday that there was no longer any reason to continue the drillings.

The SKB plans instead to continue the studies in Asele, where so far a deposit has been found that is equal to a third of that in Hothagen.

"The uranium at Hothager is there, and that is good to know. At Asele, on the other hand, we hope to find additional deposits near the first one," says Bjurstrom.

Some Scepticism

SKB's announcement was received Tuesday with some scepticism. "It's a case of high-level thievery and roguishness," believes Aino Blomqvist, member of the Central Party on the district board and vice chairman of the consultation group which supervises uranium matters in the district.

According to Blomqvist, the SKB has actually always been interested only in finding a suitable storage site for the highly active nuclear waste.

"Now they have finished drilling at Hothagen and are putting that on the reserve shelf to go drill at Asele. In a few years the SKB will go to the government and tell them that they have found some sites that are very good for waste storage and that it is the job of the government to decide. Then it will be already a fact, Blomqvist tells DAGENS NYHETER.

9992
CSO: 5100/2525

SWEDEN

BRIEFS

NUCLEAR WASTE DISPOSAL SITE--In Sweden, at a distance of 150 km north of Stockholm, miners are excavating two tunnels under the sea bottom which will serve as access for the final deposit of Sweden's slightly to moderately radioactive waste (SFR). To date the project has advanced over a length of 300 meters. The storage area will be reached by the beginning of 1985 and the excavation of the caverns will then be able to begin. The SFR deposit will probably get underway in 1988. Different kinds of compartments are planned for the two types of waste: 95 percent of the material will be confined in deep silos, while waste with weaker radioactivity will be stored in longitudinal caves. The final storage area is expected to handle about 100,000 cubic meters of waste produced by the 12 Swedish nuclear power plants during their entire operational period. In a second construction phase, still to be completed before the end of the century, two more silos and three caverns will be excavated for waste coming from the dismantling of the nuclear power plants. [Text] [Rome NOTIZIARIO DELL'ENEA in Italian Aug-Sep 84 pp 80-81] 8568

ASEA WOULD BUILD TREATMENT FACILITY--Asea-Atom plans to build an entirely new facility for processing uranium waste at Finnslatten in Vasteras. It is primarily the waste from Sweden's own nuclear fuel production that is to be recovered. This results in at least 15 metric tons of waste annually. Sigvard Junkrans at Asea-Atom calculates that approximately 4 tons of uranium could be recovered annually. No radiated fuel is to be processed in the planned facility. [Text] [Stockholm DAGENS NYHETER in Swedish 11 Dec 84 p 8] 9992

CSO: 5100/2525

TURKEY

AKKUYU CONTRACT POLITICS, ELECTRICAL ENERGY PRODUCTION

Background

Istanbul DUNYA in Turkish 26 Dec 84 pp 1, 7

[Interview with Energy and Natural Resources Minister Cemal Buyukbas by Sevil Kantarci, 25 Dec 84, place not given]

[Text] Ankara--Energy and Natural Resources Minister Cemal Buyukbas said in reference to the nuclear power plant projected to be built in the Akkuyu sector of Silifke that talks had been completed with "AECL" [Atomic Energy of Canada Ltd] and "KWU" [Kraftwerk Union], the two most likely firms, and that agreement had been reached on the "build-operate-turn over" formula.

The Minister of Energy and Natural Resources said that the file on the nuclear power plant would be submitted to the Economic Affairs Supreme Coordination Council at the end of the month and a final decision would subsequently be made by Prime Minister Turgut Ozal.

Stating that many private sector applications to build electric power facilities had been received, Cemal Buyukbas said that the go-ahead had been given to Cukurova Electric, Inc. and Kepez, Inc. Buyukbas noted that from the 26 firms that applied, the feasibility reports by Alarko [Industry and Trade, Inc], Astas [Mediterranean Cold Storage and Packing Plants Industry, Inc] and Yurttas Construction Industry, Inc were under review.

Energy and Natural Resources Minister Cemal Buyukbas pointed out that, in making a final selection for the nuclear power plant, Turkey's economic and political relations with the West and the European Economic Community in particular "would not be influential." "The only criterion we will take into account is the realization of this project with the least domestic funds possible and according to the standards we desire," he said.

Questions answered by Energy and Natural Resources Minister Cemal Buyukbas in an interview with DUNYA follow:

DUNYA: Would you discuss the results of the new talks you held with the Canadian firm AECL about the nuclear power plant?

Buyukbas: My talks with the Canadian firm AECL were more positive than I had hoped. The firm offered extra reductions at the conclusion of the talks.

[Question] Other than the Canadian firm, you also had talks with the West German firm KWU yesterday (day before yesterday). Did this firm offer new proposals?

[Answer] We talked with an official of the West German firm KWU. I had some reservations about certain points in the KWU proposal and I explained these points to them. They agreed with me, and once those problems were out of the way the firm was wholly supportive of our "build-operate-turn over" model.

[Question] Will you have further talks with either firm? And, if not, would you discuss what stages come next?

[Answer] My talks with the firms' officials are finished. I will now finish up the proposals and submit them to the Economic Affairs Supreme Coordination Council by the end of the month. Once they are reviewed there, the matter will go to Prime Minister Turgut Ozal for approval.

[Question] Will Turkey's foreign diplomatic status be a factor in the preferences? For instance, West Germany is one of the two countries standing up for Turkey in the EEC. What will the situation be if KWU is not selected?

[Answer] This situation will not be influential in our preferences. Our relations with the EEC and the contract award for the nuclear power plant are two different things. We are selecting the firm that will build a nuclear plant with the least internal funds and to the standards Turkey sets.

[Question] Would you now discuss the law passed enabling private firms to build electricity production facilities? Why was this law felt to be necessary?

[Answer] The private sector used to build electricity production facilities, but this situation was terminated by the law that revised the status of the Turkish Electric Power Corporation [TEK]. However, owing to its position under the former status of the TEK, private enterprise had started a lot of undertakings. If this had not been codified, a lot of problems would have erupted. So, for this reason, we passed a law to allow private enterprise into the electricity business in production, transmission and distribution facilities and to lift the TEK monopoly. Thus, this problem, which was a defect in the TEK's status, has been repaired by the new law.

[Question] What do the firms have to do in order to build an electricity production facility?

[Answer] To build electricity production facilities, businesses obtain a permit for which they apply to the Energy Ministry. Applications for commercial electricity, whether production, transmission or distribution, will go to the Council of Ministers on the basis of principles drawn up by the Energy Ministry. The Council of Ministers will make the decision.

[Question] Which firms have applied to build electricity production facilities? Which ones have been issued permits?

[Answer] There was one application to build a thermal power plant. The firm wants to form a consortium with a foreign firm to build a coal-fired power plant in Adiyaman using low-calorie coal it owns. Another is applications to build a medium-output hydraulic power plant. There are also two applicants in Tortum, one in Erzurum, four in Amasya and one in Hasanlar. Cukurova Electric applied for power plants in Sir and Duzkesme for which we issued permits.

[Question] Could you give the complete list of applicants?

[Answer] There are 21 firms that want to sell all of the electricity they produce to the TEK and 5 that want to produce electricity for their own use. The firms wishing to produce electricity for their own use are called self-producers. They will sell their excess electricity to the TEK and, if production is inadequate, they will purchase electricity from the TEK. Permits were issued to two firms which applied to sell all of their electricity to the TEK. One is Cukurova Electric, Inc which applied to build a dam and hydroelectric plants at Sir on the Ceyhan River, a dam at Duzkesme and a power plant at Berke. Their plant power will be 261 megawatts and they will produce 725 million kwh of electricity a year. Moreover, the Berke plant will have 150 megawatts of power and will produce 678 million kwh a year. The second firm receiving a permit was Kepez. It will build a 1.5 megawatt plant in Antalya and produce 12 million kwh of electricity a year.

Three of the other firms sent feasibility reports. They are being studied. They have some shortcomings which are in the process of being completed. The first of these firms is Alarko, which will build a 12-megawatt plant in Hasanlar, Bolu. Annual production will be 40.3 million kwh. Then Yurttaslar Construction Industry, Inc will build a plant in Malatya. This will be a 13.6-megawatt facility and will produce 67 million kwh of electricity.

They also want to build a plant at Tohma. Astas will have a 10-megawatt plant at Egridir, Isparta, producing 45 million kwh. They also applied to build a hydroelectric plant at Yilanli. The other 16 firms that did not send feasibility reports include the 5 wanting to build plants to supply their own needs. We are waiting for their feasibility reports.

[Question] Will only the applicants to produce electricity and sell it to the TEK or to meet their own needs receive approval? Does the law speak of any other system?

[Answer] If there are firms wishing to engage in production, transmission, distribution and electricity sales in a region, that is permitted also. Provisional article 3 of the new law covers this. If firms wish to do this, they will produce electricity, sell it in the region and earn the profits. If they have too much, they will sell it to the TEK. They will use the TEK interconnected system. Certain firms, if they wish, can request work in this way. That is, if Kepez wished or if Cukurova Electric wished, they could apply for this sort of changeover.

[Question] Could the production and sale of electricity by private firms under the new law bring about higher electric bills?

[Answer] This situation will not cause the increase of electricity rates. The purpose of this is to provide for private business and the citizenry, too, to be partners in the new facilities. That is, these energy-related investments are to provide the government easier financing. Thus we will have used the capital available to the citizenry to the best advantage. In this way, the building and operation of production, transmission and distribution facilities will be possible not just by the state, but by private business as well. That is, a contribution will be made to the financing of energy investments in this area.

AECL Wins Contract

Istanbul CUMHURIYET in Turkish 29 Dec 84 pp 1, 8

[Text] CANDU Reactor

The nuclear power plant that Atomic Energy of Canada Limited (AECL) would build is a 635-megawatt plant. It is a heavy water reactor of the CANDU type which was developed by this firm.

One of the most important features of these reactors is the ability to use natural uranium that can be produced in Turkey. It is also possible for the plant, which uses around 85 tons of natural uranium a year, to use the element Thorium, in which Turkey is very rich, instead of this fuel.

Ankara (CUMHURIYET BUREAU) - The debate over "who will build the nuclear power plant" that started about a year ago ended yesterday. The Ozal government decided that the Canadian firm AECL will build the nuclear power plant planned for Akkuyu. The Canadian firm's Turkish partner will be ENKA Holding [ENKA Construction and Industry, Inc], it was reported.

An important meeting about the nuclear power plant was held yesterday at the Ministry of Energy and Natural Resources. Attending the meeting besides ministry officials were officials from the Turkish Atomic Energy Commission, State Planning Office Under Secretary Yusuf Ozal and TEK officials. At the conclusion of the meeting, at which bids on the nuclear plant were given a final "official" review, the decision adopted at the highest level of the Ozal government was gone over once more by those in attendance. According to information obtained, Prime Minister Turgut Ozal chaired a preliminary meeting attended by one or two other ministers early in the week. The decision to have the Canadian firm build the nuclear power plant was reached at this meeting. This top-level decision was reviewed by technicians at a meeting called at the Energy Ministry yesterday and was conveyed to the Canadian firm.

The Akkuyu Nuclear Power Plant that will be built by the "build-operate-turn over" formula has been a subject of debate for many years, but reached the contract stage early this year. A great rivalry began among Swedish, American, German and

Canadian firms. Then Germany's KWU and Canada's AECL were left for the finale. The finale lasted nearly 6 months. The Ozal government would occasionally make extra demands of the firms. The government choice was leaning toward the German firm at one time. Then it changed its mind. In recent weeks, Energy and Natural Resources Minister Cemal Buyukbas himself had taken to saying, "Who will build the nuclear power plant has become a political choice."

The bids received from the German and Canadian firms on 30 November were given a final scrutiny at the beginning of the week and, as the minister put it, "the political choice was made."

Kutlutas Holding is the Turkish representative for the German firm KWU, while the partner and representative of the contract-winning Canadian firm is ENKA Holding.

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